# SCRAPIE ERADICATION ACT

## HEARING

BEFORE THE

SUBCOMMITTEE ON LIVESTOCK, DAIRY, AND POULTRY

OF THE

COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

**H.R. 799**

JULY 27, 1989

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# SCRAPIE ERADICATION ACT

THURSDAY, JULY 27, 1989

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LIVESTOCK, DAIRY, AND POULTRY,
COMMITTEE ON AGRICULTURE,
*Washington, DC.*

The subcommittee met, pursuant to notice, at 9:35 a.m., in room 1302, Longworth House Office Building, Hon. Charles W. Stenholm (chairman of the subcommittee) presiding.

Present: Representatives Olin, Campbell, Johnson, Harris, Volkmer, Penny, Long, Gunderson, Lewis, Smith, and Walsh.

Staff present: Vernie Hubert, associate counsel; Alice Devine, minority associate counsel; Glenda L. Temple, clerk; Daniel B. Waggoner, Theresa Green, James A. Davis, Christy Scott, and Carol Ann Dubard.

## OPENING STATEMENT OF HON. CHARLES W. STENHOLM, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. STENHOLM. This public hearing will come to order.

Today, the House Agriculture Subcommittee on Livestock, Dairy, and Poultry looks forward to receiving testimony and written statements from a very distinguished and knowledgeable slate of witnesses focused upon H.R. 799, the Scrapie Eradication Act.

Let me be quick to acknowledge the strong support which this legislation has received by its principal sponsor, Congressman Jim Leach of the First Congressional District of Iowa. In fact, this subcommittee looks forward to having Congressman Leach as its first scheduled witness today in support of H.R. 799.

As a livestock producer myself, I know from experience that it is much more productive and economical to prevent disease than to treat sick animals. Herd and flock health management is a program of cooperation between the producer and veterinarian and should blend with proper management procedures that occur throughout the year.

Today, livestock producers can do a great deal to keep their animals free of disease. However, existing measures have provided no complete guarantees for a disease such as scrapie. As we will learn this morning, scrapie is a degenerative central nervous system disease of sheep and goats that is incurable and for which there is no live animal preclinical diagnostic test.

Since it was first diagnosed in the United States in 1947, various attempts have been made to eradicate the disease. However, beginning with 1980, the number of flocks with diagnosed scrapie outbreaks has increased dramatically. According to testimony that

will be presented today, it is projected that 260 flocks of sheep, consisting of 15,000 animals, will be exposed to scrapie by the end of this fiscal year. Currently, the options appear extremely limited in effectively controlling scrapie.

On July 12, 1989, the Department of Agriculture announced that it would continue its present scrapie program until it can be revised or alternative programs can be considered. I encourage the Department to move swiftly in its negotiated rulemaking procedure in developing a scrapie program which meets animal health, industry, State and Federal needs.

The subcommittee applauds the effort of the sheep industry development program and looks forward to reviewing its recent report surrounding scrapie. Moreover, efforts of supportive organizations such as the U.S. Animal Health Association and the American Sheep Industry Association are both acknowledged and appreciated.

Let me conclude my opening remarks by complimenting USDA and the Animal and Plant Health Inspection Service for their record of success in developing effective animal health programs. Through industry, State, and Federal cooperative efforts we have eradicated over 12 major diseases of livestock and poultry within the past century.

Beyond that, we have kept devastating foreign diseases away from our shores. Regrettably, our inability to eradicate scrapie is a serious problem. This subcommittee understands the concerns of producers and appreciates the challenges which face the scientific community.

I know my colleagues join in my assurance that we stand ready to assist in supporting efforts of industry and USDA officials to develop a more effective approach to this difficult and complex disease.

At this point I would recognize any of my colleagues for opening statements or comments they might like to make.

Mr. Olin.

Mr. OLIN. I just want to congratulate the chairman for having this hearing. Prior to reading about this subject in the last couple of days, I really have known very little about it. It sounds very serious and I certainly commend the chairman for having the hearing, and I look forward to learning all you can tell us about this subject.

Mr. STENHOLM. Mr. Smith.

Mr. SMITH. Mr. Chairman, you are exactly correct, preventing these kinds of diseases is much more cost effective than treating the result. You know, of all the diseases in this country—hoof and mouth, brucellosis, scrapie—they all—and many more—are diseases that we have had huge success, and I look forward to bolstering up this program on scrapie. The only suggestion I might have for westerners is to add the eradication of scrapie in coyotes. That might help a lot. [Laughter.]

Mr. STENHOLM. Mr. Campbell.

Mr. CAMPBELL. Thank you, Mr. Chairman. I have no opening statement. In fact, I have three committee meetings going on at the same time this morning, so I won't stay, but I wanted to come down and pick up the testimony so that I can review it when I

have a little more time. But wool growers in my district are a very important part of our economy out there and I just want you to know that I am also concerned with this. Thank you.

Mr. STENHOLM. Mr. Johnson.

Mr. JOHNSON. Similar to Mr. Campbell, I have some other obligations, but this is an important hearing. I commend your holding it. There are some critical issues here before us, and I'm looking forward to an opportunity to examine closely the testimony and the recommendations that come about because of this hearing.

Mr. STENHOLM. Mr. Walsh.

Mr. WALSH. I have no opening statement, Mr. Chairman. Thank you.

Mr. STENHOLM. Before we call our first witness, let me announce that today's hearing record will remain open for 10 days for the purpose of receiving additional and requested written information.

[H.R. 799 follows:]

I

101ST CONGRESS
1ST SESSION

# H. R. 799

To authorize the Secretary of Agriculture to establish and carry out programs to eradicate the disease of scrapie in the sheep and goat populations of the United States and conduct research regarding scrapie.

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IN THE HOUSE OF REPRESENTATIVES

FEBRUARY 2, 1989

Mr. LEACH of Iowa introduced the following bill; which was referred to the Committee on Agriculture

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# A BILL

To authorize the Secretary of Agriculture to establish and carry out programs to eradicate the disease of scrapie in the sheep and goat populations of the United States and conduct research regarding scrapie.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

**SECTION 1. SHORT TITLE.**

This Act may be cited as the "Scrapie Eradication Act".

**SEC. 2. CONGRESSIONAL FINDINGS.**

The Congress finds that—

(1) scrapie, a fatal disease of the central nervous system of sheep and goats, has no known cure and cannot be detected until the infected animal becomes symptomatic;

(2) countries other than the United States that have significant sheep industries, such as Australia, New Zealand, and the United Kingdom, have determined that the most effective approach to dealing with the problem of scrapie is thorough eradication of the infected populations;

(3) there is a substantial possibility that scrapie may be spread laterally among sheep and goat flocks rather than vertically through sheep and goat bloodlines;

(4) it is possibile that scrapie can spread to other forms of livestock; and

(5) the Secretary of Agriculture should implement a national policy to eradicate scrapie in the United States.

**SEC. 3. SCRAPIE ERADICATION PROGRAM.**

(a) AUTHORITY.—The Secretary of Agriculture shall establish and carry out a program to control and eradicate the disease of scrapie in sheep and goats and to indemnify the owners of any sheep or goats destroyed under the program. The Secretary may consult, cooperate with, and involve

State and local agencies, farmers' associations, and other interested organizations and individuals, in establishing and carrying out the program.

(b) APPRAISAL.—The Secretary of Agriculture shall provide for the appraisal of sheep and goats destroyed under the program established under this section to determine their fair market value.

(c) AMOUNT OF INDEMNIFICATION.—The amount paid to an owner for each sheep or goat destroyed under the program established under this section shall be the lesser of the following:

(1) APPRAISED VALUE.—Eighty percent of the amount equal to the fair market value of the sheep or goat, as determined by appraisal under subsection (b).

(2) $500.—$500.

SEC. 4. SCRAPIE RESEARCH PROGRAM.

(a) AUTHORITY.—The Secretary of Agriculture shall establish and carry out a program to conduct research regarding the disease of scrapie in sheep and goats. The program shall include research regarding the following:

(1) DETECTION.—Methods for detecting infection of animals with scrapie before the animals become symptomatic.

(2) TREATMENT.—Methods for treatment, prevention, and cure of scrapie.

(3) SPREAD.—Methods for controlling the spread of scrapie.

(b) GRANTS AND CONTRACTS.—In carrying out the program established under this section, the Secretary of Agriculture may, subject to amounts provided in appropriations Acts, make grants to and contract with Federal, State, and local agencies and any other organizations that are experienced in research regarding animal diseases.

**SEC. 5. REGULATIONS.**

The Secretary of Agriculture may issue any regulations necessary in the determination of the Secretary to carry out this Act.

**SEC. 6. AUTHORIZATION OF APPROPRIATIONS.**

There are authorized to be appropriated for each fiscal year the following amounts:

(1) ERADICATION.—$9,000,000 for carrying out section 2.

(2) RESEARCH.—$2,000,000 for carrying out section 3.

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Mr. STENHOLM. For our first witness, we are honored to have our colleague, Jim Leach. Jim, welcome to the committee. I commend you for your leadership in developing H.R. 799.

**STATEMENT OF HON. JIM LEACH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF IOWA, ACCOMPANIED BY CHARLES D. SWAIM, JR., KRISTIE SWAIM, AND JOE WARRICK**

Mr. LEACH. Thank you, Mr. Chairman. Let me thank you very much for holding this hearing and giving sincerest attention to the issue.

I am no expert on the sheep industry, and I want to lay my cards flatly on the table in this. This is a story, in a microcosm, about a farmer—and I might say a farmer's daughter—and I would like to introduce Charles Swaim, from my district, his daughter Kristie Swaim, and also Joe Warrick, from my congressional district. All three are distinguished members of sheep producing families.

Mr. Swaim has one of the premier flocks in the country that got badly infected with the disease. And the reason I say a story about a farmer's daughter, Kristie, as a student at the University of Iowa, proceeded to put together the largest bibliography of information on scrapie in the country. And in my meetings with the family and with the veterinarians at the State and Federal level, I must say that there is a surprising lack of knowledge in the veterinary community. And just in terms of bibliography, she produces studies that the Swaim family has, and that no one else has, apparently, brought together, and this is of interest for several reasons.

First, what seems to be known to the veterinary community about scrapie is that it is probably vertically transmitted. But there is a 1979 study from your State, Mr. Chairman, from Mission, Texas, that indicates that scrapie can probably be transmitted horizontally. And what that implies is that the disease can be spread much more easily than we had thought, because it is a disease that has been with us quite a long time, and that it is much more difficult to contain.

Second, thanks to the Swaim family research, there is a study that has been found from Iceland that indicates that after a scrapie infested flock has been removed, that new flocks being brought in some 3 years later to the same area caught the same disease. It is not 100 percent certain that maybe the new flocks weren't infected when they came in, but it doesn't look that way. And what that implies is that the agent that spreads scrapie lasts a long period of time in the ground or the buildings or whatever.

Third, there is a study out of Great Britain that indicates that there may be cousins of scrapie that affect other forms of livestock. And if that is the case, with the possibility of horizontal transmission, plus the embedding of the disease in the ground or buildings, this may be a concern to other elements of the meat industry. And so all I would suggest to the committee is that even though this disease has been around for a long time, it is surprisingly misunderstood, and it also has received very little attention in the scientific community, which this bill is designed to start to precipitate new studies.

Finally, the countries—if we make some analogous views and perspectives—that are heavy in percentage of sheep production, like Australia, New Zealand, and Great Britain, all deal with the disease through thorough eradication. And one of the great questions; if our country doesn't, what that implies is that we will have lower standards for meat protection than several other countries, and if we were to have a scrapie spread or scrapie-alar like fear syndrome, we not only might look bad in the eyes, comparatively speaking, of some of the other countries, but we might end up jeopardizing their markets in the United States for products that they have a comparative advantage in agriculture, and they might in turn retaliate with nontariff food inspection barriers to products that we are more likely to have a comparative production advantage.

And so I would stress to the committee that this is a serious disease that appears to be on the rise rather than the decline. The modest amounts called for in this bill—$2 million for research, $9 million for eradication—strike me, if anything, to be so modest that perhaps they are inappropriately low sums. And I think that is an issue that the committee might want to address.

In any regard, I would make one other comment, and that is that I am told—and I can not verify this statistic—but that since about the mid-1950's the Wool Act has provided the U.S. Treasury approximately $10 billion in revenue. This bill, which is one of the first things the sheep industry has ever asked from Washington, amounts to about one-tenth of 1 percent of the revenues that the Wool Act has provided.

And again, I stress this about the sheep industry, we all know agriculture has many, many elements, some are more dependent on Government programs, some less. But the sheep industry has, basically speaking, never asked for a thing. It is not the largest element of American agriculture, but this is one of the things that—they feel that they are in a box, that they have been backed into a corner, and they are, in effect, beseeching Congress on this one modest item.

I appreciate very much your willingness to hear me and I would like, if I could, to introduce Mr. Swaim, who would like to make some comments as well.

[The prepared statement of Mr. Leach appears at the conclusion of the hearing.]

## STATEMENT OF CHARLES D. SWAIM, JR., SHEEP PRODUCER, DRAKESVILLE, IA

Mr. SWAIM. Mr. Chairman, members of the subcommittee, it is an honor to appear before you today to give testimony concerning the scrapie eradication program. I am appearing at the hearing primarily as a sheep producer with a personal interest in scrapie, as well as a representative of the American Sheep Industry.

I have a lengthy statement here which I will submit to you. I will make a short testimony of our problem.

Mr. OLIN [acting chairman]. Your full statement has been made part of the record, but we would like to hear enough from you

orally so that we understand the point you want to make, so take the time you need.

Mr. SWAIM. I'll give you a little of my personal history to start with. Our operation consists of approximately 1,000 acres, about 100 miles southeast of Des Moines. On this 1,000 acres we have 100-plus beef cows, a few over 1,000 purebred sheep, and we raise some corn and soybeans.

Our sheep business started when we moved on this land in 1959. In 1965 we went into the purebred business. Since then we have continually tried to upgrade our flock and it has grown to be one of the premier flocks in the United States.

Our family has been very much involved with it. All of our kids have shown lambs, shown breeding sheep, participated in the shows from the time they were the smallest, could hardly hold the animals, up to the point where they are now in college.

October 1988 we became aware that we had scrapie in our flock. We knew very little about scrapie. We had sort of been led to believe, after we found out we had it, that it was a genetic type disease and if those particular bloodlines were taken out we thought possibly we could continue our operation.

After doing some research, finding information that the disease is contagious as well as genetically linked, in December we knew our flock was doomed. At that point we went to APHIS.

Of course, in October when our flock was quarantined we had the first one diagnosed—I might mention, to diagnose scrapie positively, tissue has to be taken from the brain of the animal and submitted to the laboratory. There is no test for scrapie without sacrifice of the animal.

Since that time we have had 32 animals prove positive, perhaps the most of any case in the United States. We have asked for total flock depopulation. The cost/benefit analysis done by APHIS shows that total flock depopulation would be the most effective way of cutting the expenses and limiting the disease spread, but funds have not been available to depopulate our flock.

We have continued to feed and care for these animals. Of course, we went through the lambing season with extra labor, and as most of you know, from the drought situation last year, we were in that drought area, and we are in the same one again this year. Our sheep are drylotted, most of them at present time being fed hay, which normally would be fed next winter, and it has been a very costly operation with no way of salvaging any money back.

We have worked with Congressman Leach, our first meeting was in Des Moines early this spring. I was very happy that out of that meeting Mr. Leach put together the bill H.R. 799, and we are 100 percent behind it.

An operator, a sheepman, cannot fight this problem alone, there is no way, it is very devastating. We have to have APHIS involved, we have to have a program. At this point I must say it is the worst thing that we have ever encountered. I think the sheep industry must say it is one of the very worst things. Any time you have a disease that is contagious, it is terminal, no treatment for it, I cannot think of anything worse.

If anybody would like to ask questions, feel free to do so. I will try to answer them. As you mentioned before, my daughter Kristie

here has done a good job of searching the libraries throughout the country for scrapie information and we have put together a large file.

I think I best not take any more time. We have other people that want to speak, but I will submit this for the record.

[The prepared statement of Mr. Swaim appears at the conclusion of the hearing.]

Mr. OLIN. Fine, your testimony will be made part of the record.

Does your daughter want to say anything at this time, or Mr. Warrick?

Ms. SWAIM. I don't.

Mr. OLIN. You would rather not. All right.

The gentlemen from Oregon.

Mr. SMITH. Thank you, Mr. Chairman. I just have one question.

I understood you to say that even though APHIS, I understand, had recommended that your herd be depopulated, there is no money, but there is authorization for money for depopulation. Would you explain what occurred?

Mr. SWAIM. We depopulated a few, over 400 animals. When our case first started last October, we had 740, and when I asked for total flock depopulation, after I saw the disease was contagious and there was ground contamination and no way of continuing our operation, that was when I asked to have the total flock depopulated. And if we could have taken them at that time, there would have been 740 to depopulate.

I also expressed the fact that we were getting ready to go into lambing season and this would turn into 1,400 or 1,500 head, which it did. As I mentioned, we depopulated a few, over 400 at this time.

We have more sheep coming down dying with it, but the funds were exhausted in late April, and since then there hasn't been any funding for the animals that are coming down with it. And we still should receive money from bloodlines of the ones we have already put down, but there are no funds for it.

Mr. SMITH. Is part of this bill, Mr. Leach, the funding, the refurbishing of the fund?

Mr. LEACH. Yes. Part of it is a direct authorization of $9 million for eradication. The other part of the bill is a $2 million research program. It is simple, that is the essence of the bill.

Mr. SMITH. I commiserate with the gentleman. I had to put down 2,200 head of cows and calves from brucellosis, I know what you are going through. Thank you.

Mr. OLIN. The gentleman from Wisconsin.

Mr. GUNDERSON. No questions.

Mr. OLIN. Mr. Walsh, have you got any questions?

Mr. WALSH. No questions, Mr. Chairman.

Mr. OLIN. Let me ask you, Mr. Swaim, what has been your experience with APHIS on this problem? Have they given you any tangible help of any nature?

Mr. SWAIM. Well, of course, they sent area vets out from APHIS out of the Des Moines office, and they have been taking the tissue and there have been veterinarians at my place about every 10 days since last October, anywhere from one to three each trip. I know it has been very costly for them, too. And it has been quite an education for them.

They are all being able to see scrapie, and there are a lot of people—when you talk to the people in this room, I doubt there are too many of them that have ever witnessed seeing scrapie. And, yes, they have been workable with us, except they just did not have enough money set aside for scrapie to take care of this situation.

I believe last year the indemnities paid were in the neighborhood of $226,000, and that is very, very light. And if you want to take a look at the scrapie program since 1952, there has been about $6.5 million spent on indemnities since that time and spread all over those years.

Mr. OLIN. Did you learn from them, from APHIS people, how widespread this disease is, or maybe from some of your neighbors in Iowa?

Mr. SWAIM. No. Iowa does not have the most scrapie in the United States. I would suspect at the present time it may be in California, but we have four known flocks infected with scrapie right now in Iowa. And if you take a look at Missouri, whose just south of us, north of the Missouri River there are eight flocks on record right now under quarantine. And as you look around, it is fairly widespread, but it doesn't entail a huge amount of sheep. I believe the opening statement here was that there were somewhere around 15,000 sheep exposed. And to me the exposed sheep are the dangerous ones that are left out there, they can contaminate the premises, as well. We don't know exactly how the organism is passed on from sheep to sheep but we know it is contagious. It is not genetic, that is easy for us to see in our operation as we have had many different bloodlines as well as two different breeds of sheep come down with it.

Mr. OLIN. So you are saying that, as far as you can tell, they have not identified the organism, you don't know for sure how it is transmitted? You don't even know exactly what is causing it. Is that the present situation?

Mr. SWAIM. Well, I guess the organism is so tiny that it is extremely hard to identify. But as I went back through all the hearings on scrapie since 1952 here in Washington, I found out that through these hearings, in 1932 they knew there was land contamination, and when there was land contamination, they had proved at that point that it was spread from sheep to sheep, it was contagious then.

But since 1983, if you will come back to the APHIS program, they have had a bloodline program since 1983 treating it as if it was genetic. But, as Congressman Leach mentioned before in 1979 the study that came out of Mission, Texas, they knew about the contamination from sheep to sheep and sheep to goat at that time.

Mr. OLIN. This apparently is spreading through your flock. I think you mentioned you had 32 animals that were tested to be positive. But could you tell me to what extent this thing in your situation is known to have been going through your flock, or does that require just a level of testing you can't accomplish?

Mr. SWAIM. Well, clinical signs appear from a few weeks to several months before the animal is going to actually die, and there is no way of knowing how long it is going to go on. However, in reading some of the information, too, some sheep actually die with scra-

pie without exhibiting clinical signs. But once they start exhibiting clinical signs, it is fairly easy to see.

Mr. OLIN. What percentage of your flock has actually died on you? You say you depopulated 400. What kind of mortality did you have before you did that?

Mr. SWAIM. We had not had too awful much before that time. We identified positive scrapie on October 12, but since then, if you take a look at the long incubation period, a sheep does not show signs or die with scrapie prior to being 2 years old, and most of them are 2½ to 3 years old. And we have had no less than 20 sheep at any time since that time exhibiting clinical signs, which we have been watching. And we start taking them out of the flock, but we keep marking every day the ones that are showing signs so that we can watch them and follow those signs up.

Mr. OLIN. Any other questions? The gentleman from Missouri, do you have any?

Mr. VOLKMER. Well, I'm sorry, at first I had another meeting and I haven't heard the presentation. Have you covered the area of how widespread this is?

Mr. OLIN. Yes, the testimony Mr. Swaim has given would indicate that in his knowledge something like 15,000 sheep countrywide might have been identified as being at risk. This is not a big percentage of the sheep, I guess, but it is——

Mr. VOLKMER. Well, it is to that farmer that has sheep, because I have some in my district in northern Missouri that are very concerned.

Mr. SWAIM. Mr. Volkmer, I guess maybe you came in after I mentioned Missouri here, but I believe there are eight flocks north of the Missouri River in Missouri with scrapie.

Mr. VOLKMER. Right.

Mr. SWAIM. And to the people who don't have scrapie, it is not very important, but to the ones that have scrapie, there is nothing more important.

Mr. VOLKMER. That is correct. It is no different than brucellosis in cattle and things like that.

I have no further questions.

Mr. STENHOLM. If there are no further questions, Mr. Swaim, Ms. Swaim, and Mr. Warrick, we appreciate you being here.

We will call panel two, Dr. James Glosser and Dr. Mike Chaddock.

We will hear first from Dr. James Glosser, Administrator, Animal and Plant Health Inspection Service, USDA.

Dr. Glosser, welcome.

**STATEMENT OF JAMES W. GLOSSER, ADMINISTRATOR, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, U.S. DEPARTMENT OF AGRICULTURE, ACCOMPANIED BY HARRY MICHAEL CHADDOCK, STATE VETERINARIAN, ANIMAL INDUSTRY DIVISION, MICHIGAN DEPARTMENT OF AGRICULTURE, CHESTER GIPSON, CHIEF STAFF VETERINARIAN, APHIS; AND MARK ROBINSON, AGRICULTURAL RESEARCH SERVICE**

Mr. GLOSSER. Thank you, Mr. Chairman, members of the committee. I would like to introduce my colleagues at the witness table. To

my extreme left is my colleague and chief animal health official from the State of Michigan, Dr. Mike Chaddock. He will address issues relating to control on a State level. To my left is Dr. Chester Gipson, Chief Staff Veterinarian from APHIS in charge of the operational aspects of the scrapie program. To my immediate right is Dr. Mark Robinson, Microbiologist with the Agricultural Research Service and an expert in scrapie.

Mr. Chairman, members of the committee, it is indeed a pleasure for me to appear today to present the Department of Agriculture's views on H.R. 799, a bill to authorize the Secretary of Agriculture to establish and carry out programs to eradicate the disease of scrapie in the sheep and goat populations of the United States and conduct research regarding scrapie.

H.R. 799 addresses the problem of scrapie by, one, directing the Secretary of Agriculture to establish and carry out a program to control and eradicate the disease of scrapie in sheep and goats and authorizing indemnity for the owners of any sheep or goat destroyed under the program; two, by authorizing the Secretary to consult, cooperate with, and involve State and local agencies, farmer's associations and other interested organizations and individuals in establishing and carrying out the program; and three, directing the Secretary to establish and carry out a program of research on the detection, treatment, and spread of the disease.

The bill authorizes appropriation of $9 million to carry out the control and eradication program, and $2 million to carry out the research program. The Department does not recommend enactment of this bill.

I know of no other disease existing today that is a more difficult, more complex, animal health problem facing animal science. Several factors contribute to this problem. First, as previous witnesses have said, there are no preclinical diagnostic tests available to define the exposed and diseased animals.

Throughout the past 25 years there has been a plethora of information, but data gaps remain. It is very confusing for the industry and the scientists. There is a lack of understanding by the industry of this very, very complex issue. It is very understandable. Up until recently, industry has not come to grips with what has to be done to combat this dreaded disease, and I think that we are just at the threshold of this.

As you know, Mr. Chairman, scrapie is a fatal disease of sheep and goats. More specifically, it is a slow virus infection of sheep and goats, one of a group of transmissible diseases known as the spongiform encephalopathies. The disease develops slowly, with an incubation period that generally lasts from 18 to 60 months, but it can be longer.

Clinical signs include muscular tremors, incoordination, itching, lack of luster in the animal's wool, and in some cases loss of appetite and visible weight loss. Generally, the presence of the disease remains undetected until signs appear, because no test is available for diagnosing the disease in live animals.

APHIS, which is responsible for the scrapie control efforts, currently has about 200 flocks under surveillance for scrapie. We spend annually $850,000 from the miscellaneous line item of the APHIS budget. The miscellaneous disease line item of the APHIS

budget is utilized to conduct disease control and surveillance activities for livestock diseases not funded by direct appropriations.

Disease activities include bluetongue, bovine leukosis, equine infectious anemia, contagious equine metritis, equine viral arteritis, equine and bovine piroplasmosis, anaplasmosis, Nematodirus battus, scabies, parasitic diseases, and other diseases as well.

We also provide technical information and some surveillance support to some people interested in diseases of public health significance, such as Lyme disease, listeriosis, and Leishmaniasis and others.

Of the $850,000 spent on scrapie, about $250,000 is spent on indemnity payments for infected and bloodline related animals that are depopulated, and the remaining $600,000 is spent on regulatory and control program activities and methods development.

Regardless of whether improvements can be made in the administration of the current program, we do not believe scrapie can be effectively eradicated until a preclinical test or a diagnostic test becomes available that detects the disease in the live animal before clinical signs are exhibited; until the causative agent is identified and characterized and until the methods of transmission are fully understood. To develop a greater understanding of the disease, the Department's Agricultural Research Service and the University of Wisconsin are conducting research to develop a diagnostic test that will determine, before clinical signs are exhibited, whether an animal is infected with scrapie. In addition, the Department is working with Utah State University to learn more about the epidemiology of scrapie.

Other research projects are also being conducted and we have included a list of those projects at the end of this testimony, which I would like to include for the record.

Until scientific research results in a test to diagnose scrapie in the live animal, a regulatory modification of USDA's current program activities will result in the most effective means of ameliorating the scrapie program. We have also included at the end of the testimony a paper compiled by our ARS colleagues about the current status of science relating to scrapie.

Even if we had the tools to eradicate scrapie effectively, we believe the legislation is unnecessary because the objectives of the bill could be achieved under current authority. Section 11 of the act of May 29, 1884, 21 U.S.C. 114a, among other statutes, authorizes the Secretary to cooperate with States and their political subdivisions, farmer's associations and similar organizations, and individuals to control and eradicate communicable diseases of livestock and poultry, which includes scrapie, and to pay claims growing out of destruction or the taking of animals and materials affected by or exposed to such diseases in accordance with regulations provided by the Secretary.

Originally the eradication efforts focused an depopulation of the affected flock, exposed animals sold from the flock, and the progeny of the exposed animals. As knowledge was gained through research about the potential methods of transmission, the program has changed accordingly. The most recent change in the program, which occurred in 1983, emphasizes bloodline depopulation primarily along the female bloodline. This change was made at the request

of the industry to preserve valuable bloodline animals and to better utilize indemnity funds.

While lateral spread of scrapie was recognized at the time, the feeling was that the risk of getting scrapie by this method was minimal. For this reason, under the current scrapie program, only affected and bloodline animals are destroyed, and the rest of the flock is placed under surveillance.

When an animal is destroyed, we pay a Federal indemnity equal to two-thirds of the appraised value of the animal, not to exceed $300. However, under the current program, the number of flocks affected with scrapie continues to increase.

Because of the concerns about the program, we met in May 1988 with a panel of representatives from the sheep and goat industries, purebred associations, State regulatory officials, and the U.S. Animal Health Association.

Based on the recommendations from this panel, APHIS published an advance notice of proposed rulemaking to solicit comments on whether or not to discontinue the current scrapie eradication program in its present form. As a result of the comments received on the advance notice, we have decided to use the negotiated rulemaking process to involve interested parties in developing a workable scrapie control program. The solution to this problem will only be possible when we have an adequate scientific basis of diagnosing the disease in the live animal. Then a sustained cooperative effort involving industry, the States, and the Federal Government will be necessary to develop and maintain a successful eradication program.

For any program to be successful, it must be industry driven. It must serve industry's needs. This includes a self-policing policy to avert the nonreporting of flocks, which protects potentially exposed animals from the surveillance system.

We appreciate the opportunity to appear before you to discuss the problem of scrapie. We understand the concerns of producers about the effect of that serious disease on production and marketing, and we assure you that we will continue to support research efforts and work with you and the industry to develop a more effective and workable approach to this very difficult and complex disease.

We will be happy to answer any of your questions. Thank you.

[The prepared statement of Mr. Glosser appears at the conclusion of the hearing.]

Mr. STENHOLM. Thank you, Dr. Glosser. Mr. Olin?

Mr. OLIN. Dr. Glosser, a couple of questions. This disease falls in, as you say, the "all other" category of your work.

Does the Secretary not have authority to transfer discretionary funds to do more in this area if he chose to do so?

Mr. GLOSSER. The Secretary does have such authority. In the traditional funding of APHIS, we have put this in the category of miscellaneous disease, and we also have a contingency fund that is directly earmarked to APHIS to address unforeseen or unanticipated problems in the disease sector in the budgeting process, which, of course, is a long, drawn out issue. There are other discretions the Secretary has available, yes.

Mr. OLIN. But in this case it would appear that at least at the beginning of your work you felt that depopulation was desirable and you were encouraging and paying for it, I take it, up to some point, and then you stopped paying for it.

Mr. GLOSSER. Yes, sir.

Mr. OLIN. And whether it is still occurring or not, it would be up to the farmer then to decide what he wanted to do. What is your recommendation with regard to that subject?

Mr. GLOSSER. Well, certainly the funds that are appropriated to the agency for the miscellaneous disease category, the traditional pattern of approximately $850,000, we have had the policy, and we changed in 1983 from one of total flock depopulation to bloodline. And then in more recent times, because of the increase, and if it was in the cost benefit, we went back to whole flock depopulation.

What that is telling me and what we are experiencing and what the industry is experiencing, is that we simply don't have a clear focus on how to approach this problem adequately. The funds that we have had over the historical period of time were, I will say, sufficient and met the needs.

The way it works today is that there are—when we do an epidemiologic investigation of an infected flock and we do a cost/benefit analysis to see if the flock needs total flock depopulation, when we have diagnosed and confirmed the presence of the infection, and all of the records reviews and tracebacks are complete and the decision is made, then that flock is depopulated.

Mr. OLIN. Are you saying, essentially, that you don't know whether depopulation is worth anything or not? Is that what you are saying?

Mr. GLOSSER. No. If we do the epidemiologic investigation and the traceback and we see that it is continuing to spread, this is one of the factors that will go into our decision process, and if the decision is made to depopulate that flock, then the moneys that are available are used.

And I have to say that it is almost on a first come first served basis, and when the moneys are exhausted I have no other recourse.

Mr. OLIN. OK. Let me ask you another line of questions. On the issue of safety, is there any known hazard to human beings coming from this disease at any stage?

Mr. GLOSSER. There is no evidence that this is a public health problem. If I might defer this to one of my research colleagues here, Dr. Robinson.

Mr. OLIN. Dr. Robinson.

Mr. ROBINSON. Dr. Glosser is correct, there is no experimental or epidemiologic evidence that scrapie represents a public health hazard. It is something that we treat cautiously, though, because we know so little about the pathogen that causes the disease. While we will say that there is no public health hazard, there is no recognized risk, we try to leave the door open that there is always a potential risk. It is probably minimal to nonexistent.

Mr. OLIN. Dr. Glosser, are any members of the flocks that are found to be infected sent to market at any stage?

Mr. GLOSSER. The exposed or infected ones are not sent to market. They are destroyed and taken out of the animal food chain.

Mr. OLIN. You are not permitting any members of the flock to be slaughtered for market?

Mr. GLOSSER. That is correct.

Mr. OLIN. OK. I think that is enough for me at this point, Mr. Chairman, thank you.

Mr. STENHOLM. Mr. Gunderson.

Mr. GUNDERSON. Thank you, Mr. Chairman.

Dr. Glosser, I'm confused. You presently have a research program, you presently have a control program when you detect scrapie, and you presently have an eradication program. The bill that is in front of us calls for increased research and increased eradication, and you are opposed. What is the difference?

Mr. GLOSSER. Mr. Congressman, the difference is that in spite of 25 years experience and with the hope of having diagnostic criteria to identify an exposed animal so that we can control and ultimately eradicate the disease, that these tools have been unavailable. We are looking over our experience, and we dubbed the program an eradication program, but it simply isn't.

What I'm saying today—very straightforwardly, I'm not happy with what I am saying—is that we do not have the tools to control or to eradicate at this time. And we just have to focus on the fact that there are additional research needs before there can be an effective, workable control and eradication program from the Department of Agriculture.

No one likes to say that we are up against a blind wall, but that is where we are.

Mr. GUNDERSON. But why are you going through a negotiated rulemaking process then? What is the difference between starting over in the rulemaking process and what this legislation is suggesting?

Mr. GLOSSER. I firmly believe, Mr. Congressman, that we have to continually seek out and explore and probe alternate ways to gather the industry consensus to make something enforceable, make something workable, that is practical, that meets all of the industry needs. In the past, the industry has been divided on this. And I firmly believe that, in view of a hazy approach to control and no methods to eradicate, that we have to come to grips with the States, with the industry, and the Federal Government to work out something that is practical.

Mr. GUNDERSON. By "no methods to eradicate," are you suggesting simply no money?

Mr. GLOSSER. Pardon me?

Mr. GUNDERSON. By "no methods to eradicate," are you suggesting that there simply isn't money to fund eradication and indemnification?

Mr. GLOSSER. We talk about 15,000 animals under surveillance in these 200 flocks. I am not certain that that is even a true reflection of the problem. It could be very much more widespread than that. The scientific community simply has no good feel for this, and there are many other diseases that have to be dealt with in the dif-

ferential diagnosis. So I am saying we have no idea as to the true prevalence of scrapie in the United States today.

Mr. GUNDERSON. So then the only real concern is putting a price tag on what indemnification would cost?

Mr. GLOSSER. What it is going to take to, hopefully, stop the spread and gather the information so that it can be controlled is a very strong partnership and bond between the industry and the governmental entities.

Mr. GUNDERSON. You mean you are not opposed to research?

Mr. GLOSSER. Absolutely not.

Mr. GUNDERSON. You are not opposed to control. You are not opposed to indemnification, because you are doing it now.

Mr. GLOSSER. That is right.

Mr. GUNDERSON. I am still confused. What is the problem, is it just money?

Mr. GLOSSER. No, sir. I am certainly not opposed to research. I am not opposed to control and eradication, because that is the mission of APHIS. What I am with all candor today saying is that we do not have the tools to adequately and most efficiently expend moneys on a program. We need the support and the understanding of all involved.

Mr. GUNDERSON. Define for me "tools."

Mr. GLOSSER. Preclinical tests that will delineate exposed and nonexposed, one that is in the prodromal sign of infection so that those animals could be immediately taken out with little administrative or scientific review, those can be immediately taken out of the population at risk. To be able to trace to other flocks in which the bloodlines 4 to 5 years prior may have been contributing to this. That is what I mean by tools.

Mr. GUNDERSON. You can detect scrapie today?

Mr. GLOSSER. After the fact when they are dead.

Mr. GUNDERSON. They have to die first?

Mr. GLOSSER. Yes, sir.

Mr. GUNDERSON. That isn't what the testimony says.

Mr. GLOSSER. Clinically, when they——

Mr. GUNDERSON. "Clinical signs include muscular tremors, incoordination, itching, lack of luster in the animal's wool and, in some cases, lack of appetite and visible weight loss." Those are your words.

Mr. GLOSSER. That is correct sir, but what is not being addressed here, and the concern that we have, is in those incubating, nonclinically demonstrable animals, we have no method to determine whether they are going to further contaminate that flock or other flocks in the ultimate exchange of germ plasm.

Mr. GUNDERSON. You conduct some kind of indemnification right now.

Mr. GLOSSER. Yes, sir.

Mr. GUNDERSON. And that is done what, by the brain tissue?

Mr. GLOSSER. Yes, it is a post mortem examination and histopathological examination of brain tissue, and it is not complete by any means. The pathologists have had varying degrees of discussion as to what constitutes a scrapie case or what doesn't. Many of them are suspicious.

Mr. GUNDERSON. In what order is the control program right now? I mean, if the only way you can detect the disease is after death looking at the brain tissue, how do you go in and control a herd today?

Mr. GLOSSER. Exactly that, after the fact. Like most veterinary issues, scrapie is a herd problem, it is not an individual problem. Basically, once you have established the existence of the disease in one animal or more, that whole flock is suspect and needs to be evaluated as to what poses a risk and what doesn't. That is where the diagnostic test is so important.

Even more importantly is the previous exchanges of animals from that flock to other flocks so that you can go to other entities and say, you received animals from such and such a flock, we need to test those to see if they are about to break with scrapie or are clean—assurance, assurance testing.

Mr. GUNDERSON. Mr. Chairman, my time is up. But I have to say, Dr. Glosser, I am still confused as to how you can run a program with the evidence that you have now, but you are opposed to running a broader program, which this bill says. So we need to work on that later on, but my time is up.

Mr. GLOSSER. Indeed we do, because I'm confused, too, sir. It is not a workable program, is what I am saying.

Mr. GUNDERSON. We have agreed on that, we are both confused. [Laughter.]

Mr. STENHOLM. Mr. Volkmer.

Mr. VOLKMER. Dr. Glosser, as I understand it, you correct me if I'm wrong, New Zealand and Australia are scrapie free; is that correct?

Mr. GLOSSER. That is correct.

Mr. VOLKMER. How did they get there if we can't get there?

Mr. GLOSSER. On the early recognition of infected animals, I guess back in the early 1950's, late 1940's, they took all animals out that were——

Mr. VOLKMER. They did what? Pardon me?

Mr. GLOSSER. They depopulated all animals that were introduced from, principally, Great Britain, but other countries where the animals were introduced onto the continent or to the islands, and they have maintained, through rigorous quarantine and exclusion, no introduction of sheep from other countries.

Mr. VOLKMER. In other words, they basically had an eradication program, they eradicated any suspected sheep?

Mr. GLOSSER. They intercepted the infection, recognized it and took care of it before it became endemic on the continent, or the country, yes.

Mr. VOLKMER. Right. Dr. Robinson, in your answer to the gentleman from Virginia, I didn't hear you say that there cannot be a lateral transmission to humans.

Mr. GLOSSER. We think that there is lateral transmission, and there is vertical transmission. This is one of the confusions——

Mr. VOLKMER. To humans?

Mr. GLOSSER. To humans, no, I'm sorry. There is no evidence to suggest that this is any problem to humans whatsoever at this time.

Mr. VOLKMER. Dr. Robinson, are you sure about that?

Mr. ROBINSON. Am I sure? There is a very strong species barrier to scrapie. In order to introduce it into the animal in which we work with it, there are sometimes several passages by a very invasive route. We inject infectious material into the brains of the animals that we are using experimentally.

At every species barrier there is a strong resistance to adaptation of the pathogen, and there is really only one example in the group of carnivores in which there is a possible transmission from ruminants to carnivores, and that is the occurrence of transmissible mink encephalopathy. Otherwise, sheep scrapie probably does not cross barriers directly through normal contact with other animals in the field.

Mr. VOLKMER. OK, thank you very much. Then what about to cattle, sheep to cattle lateral?

Mr. ROBINSON. I would say at this time we have very little evidence concerning that question. It is under study both in Great Britain and here, but, again, the transmission to cattle directly by contact with sheep is less likely than the cattle being fed sheep products from a rendering process, like a protein supplement.

Mr. VOLKMER. Just being pastured in the same pasture isn't going to necessarily transmit this?

Mr. ROBINSON. Pasture contamination is something that would take—experiments have not been properly done in the past and it would take many years to answer that with a good, concrete answer. I would say that on the list of routes of transmission, that pasture contamination is probably fairly low, if it occurs at all.

Mr. VOLKMER. All right. Dr. Glosser, do you have industry resistance to a full-scale eradication program?

Mr. GLOSSER. I wouldn't characterize it as resistance, Congressman. I will say that there are divisions of ideas and approaches to how this can best be done. This is why we are proposing to do a negotiated rulemaking to get all segments of the industry together at the same table and find out what is workable and enforceable.

Mr. VOLKMER. At the present time, when you do an eradication of infected herds, do you eradicate the male species as well as female species?

Mr. GLOSSER. If it is a total flock depopulation. If it is a bloodline, we emphasize mainly the female, but if they were clinically affected in the bloodline, we would take males.

Mr. VOLKMER. But if it is determined that it is only from a certain bloodline, you would not do the whole herd, just the females; is that correct?

Mr. GLOSSER. That is correct. This is the change that we instituted in 1983 at the advice of industry, or one segment of the industry.

Mr. VOLKMER. May I have additional time for just another question?

Do you foresee a continued growth in the scrapie infection in our herds with the type of activity that we are presently doing?

Mr. GLOSSER. Yes, sir, I do, with the fact that we do not know the true prevalence and that we have not been able to have precise, discrete delineation of the exposure and other contaminated herds, and with the long incubation period, I believe we are going to have more and more cases.

Mr. VOLKMER. Because we have got herds out there that right now are potentially breeding stock, that is, potentially could have scrapie right now, that are being moved all over the country and could be infecting other herds.

Mr. GLOSSER. That is right. One of the things that is so elemental and yet so vital to this is early reporting and sharing of this so that those unfortunate transfers, unknowing transfers, of incubating animals are——

Mr. VOLKMER. Well, some of my sheep producers in my district have said when they bought their breeding stock from Mr. Swaim, they didn't know that——

Mr. GLOSSER. That is right.

Mr. VOLKMER. They had no idea that they were going to have scrapie, but now they have scrapie.

Mr. GLOSSER. That is right. That is why it is so important that we get the types of tools necessary to conduct a control and eradication program.

Mr. VOLKMER. I just want to note that we really had an all out fight on brucellosis, that we started eradicating whole herds as soon as you had a detection of brucellosis in that herd, and that has helped us a great deal, especially in Missouri.

Mr. GLOSSER. That is right.

Mr. VOLKMER. You are not right now, prepared to do that?

Mr. GLOSSER. That is correct. We don't have the tools. Brucellosis, if I may, sir, is——

Mr. VOLKMER. Well, you have the tools. Is the $300-limit a statutory limit or is that a regulatory limit?

Mr. GLOSSER. It is a regulatory limit, sir, based on market values.

Mr. VOLKMER. If you got that up higher, as proposed in the legislation, even up to $600, don't you think you would have more cooperation for eradication?

Mr. GLOSSER. It would certainly bring more people forward, yes, that have reason to believe that they are exposed to it.

Mr. VOLKMER. Thank you, Mr. Chairman.

Mr. STENHOLM. Mr. Walsh.

Mr. WALSH. Thank you, Mr. Chairman. I would like to ask any of these gentlemen if you could tell me, when a herd is infected with this disease, are all the animals kept from market?

Mr. GLOSSER. I would like to defer this to Dr. Gipson, who is in the operational aspects of the program. Dr. Gipson.

Mr. GIPSON. Thank you. Under the current bloodline program, when a herd is diagnosed as being infected with scrapie, the bloodline animals are removed and the remaining animals are allowed to go into commerce, which means they can go to slaughter.

Mr. WALSH. So animals just from that bloodline are taken out and put in quarantine?

Mr. GIPSON. Well, under the policy, the bloodline animals are destroyed.

Mr. WALSH. They are all destroyed?

Mr. GIPSON. Right, all bloodline animals are destroyed.

Mr. WALSH. And then the rest of the animals then are available for market?

Mr. GIPSON. Right, they are available for market and they are placed under a 42-month surveillance.

Mr. WALSH. And even though there is no demonstrable evidence that this disease has no affect on humans through consumption, that meat is thrown away, correct?

Mr. GIPSON. You mean the animals that are depopulated? Yes, they are destroyed and they are not put in the slaughter chain, even though there is no demonstrable evidence. That is correct.

Mr. WALSH. This is a viral infection?

Mr. GIPSON. Yes, it is believed to be a virus.

Mr. WALSH. Is this a disease that is cyclical in nature? In other words, at times there is more of it than at other times?

Mr. GIPSON. Not based on the evidence that we have seen.

Mr. WALSH. And the flocks in this country, most of them are derived from Great Britain and the British Isles?

Mr. GIPSON. Well, I really couldn't say that.

Mr. WALSH. Well, the point was made by Mr. Volkmer that New Zealand and Australia have no scrapie in their flocks, true?

Mr. GIPSON. Correct.

Mr. WALSH. How difficult would it be to undergo the sort of program that they underwent?

Mr. GIPSON. Well, first of all, we would have to understand the program that they underwent and why their program was possibly successful and ours has failed to date. Number one, as stated, Australia detected the disease very, very early in introduction. And while the statement is made they depopulated a number of animals, in fact they depopulated less than 50 animals.

I think the other point that needs to be made is that Australia is primarily Merino country, Merinos demonstrate some resistance to scrapie. If you look at the scrapie situation here in the United States, it is primarily within the Suffolk breed, and the Suffolk sheep seem to have a genetic predisposition for the disease. So that is the primary difference in why they were successful and we were not.

The other thing is that when scrapie was introduced in 1947, initially, had we had a depopulation program or a program, we possibly could have done the same thing Australia did, but in fact they learned from our mistake.

Mr. WALSH. Thank you very much, doctor. I have no further questions.

Mr. STENHOLM. Mr. Harris.

Mr. HARRIS. Dr. Glosser, I notice in your statement that you are opposed to this legislation; is that correct?

Mr. GLOSSER. Yes, sir.

Mr. HARRIS. Is it something, in your opinion, you don't need, or is there something else that you need that this legislation doesn't cover? What is your administration's position on that?

Mr. GLOSSER. The administration's position is that the bill as drafted would limit the Secretary's discretionary authority. We have the authority already to enter into these types of issues. The bill, itself is based, in the testimony I have said before, in great confusion; we simply do not have the tools for an eradication program, so that the title of the bill in itself is, in our view, misleading.

But the principal reason is the limiting of the discretionary authority of the Secretary.

Mr. HARRIS. What tools do you need?

Mr. GLOSSER. We need preclinical diagnostic tests, sir.

Mr. HARRIS. Well, is that in the future?

Mr. GLOSSER. I hope so.

Mr. HARRIS. Near future?

Mr. GLOSSER. I have asked my scientists, colleagues how long is it going to take to get this. We have asked that question for 25 years. I don't mean to be jocular about it, it is a very complex, difficult virus or virus-like entity to research. Clearly, there has to be a breakthrough that will allow, either through DNA marking or fingerprinting or diagnostic probes, or other diagnostic tests that will allow the early recognition of an infection, rather than waiting some 40 to 60 months when you get the clinical signs, the central nervous signs, which is the entree to death. The disease is fatal.

Mr. HARRIS. In what way does this cut down on the authority of the Secretary?

Mr. GLOSSER. Predominantly, we feel that the authority that the Secretary has in the existing statutes to cooperate with State, industry, research, the authority is already existing and it is discretionary.

Mr. HARRIS. I noticed under "authority" it says,

> The Secretary of Agriculture shall establish and carry out a program to control and eradicate the disease of scrapie in sheep and goats and to indemnify the owners of any sheep or goats destroyed under the program.

You say you already have that authority?

Mr. GLOSSER. The Secretary has the discretionary authority. We oppose this bill because it is a mandatory provision.

Mr. HARRIS. Well, you are not against what the bill wants to accomplish, are you?

Mr. GLOSSER. The objectives of the bill are well focused. The fact that you are mandating the Secretary to do something when he does not have the tools in order to do it is our opposition to it.

Mr. HARRIS. All right. Of course, it says, "The Secretary may consult, cooperate, and involve State and local agencies." That is discretionary there, isn't it?

Mr. GLOSSER. Yes, sir.

Mr. HARRIS. So an additional $9 million for eradication, in your opinion, you don't need?

Mr. GLOSSER. I don't think $9 million is—I don't think you can do it with $9 million, frankly. I don't think we know the true prevalence of the disease.

Mr. HARRIS. And $2 million for additional research. You say you have been researching it for 25 years?

Mr. GLOSSER. Yes, sir.

Mr. HARRIS. Have we made any progress?

Mr. GLOSSER. There have been very valuable pieces of information put together, but it has not been holistic in the early detection of the disease in the animal, which is absolutely critical to run a field control and eradication program.

Mr. HARRIS. I'll yield to the gentleman from Virginia, if you want. You may use my time.

Mr. OLIN. Thank you very much, Mr. Harris.

I wanted to clear up one point, Dr. Glosser. Dr. Gipson, when describing the depopulation, said that you depopulate only in the bloodline flock. You told me that you depopulated the whole herd, the whole flock. Which way is it?

Mr. GLOSSER. The whole flock depopulation is based—after the initial diagnosis is made and we do an epidemiologic and cost/benefit study—on whether it is in the interest of the program and the factors are there. We will do whole flock depopulation in certain instances. Our procedure since 1983 has been the——

Mr. OLIN. What is the cost/benefit calculation you made there?

Mr. GLOSSER. If I may, I will let Dr. Gipson describe that.

Mr. OLIN. Yes, Dr. Gipson.

Mr. GIPSON. On the total flock depopulation, when we do a cost/benefit analysis, we look at a couple of things. Because it is based on bloodline, if the producer does not have good records, or good animal identification, and we take a look in there and see that we cannot identify which bloodlines to take out, but there is a potential for those animals to get into interstate commerce and create a problem, then that is one consideration in terms of total flock depopulation.

Mr. OLIN. But you also say that it is possible you are getting lateral transmission, is that not the case?

Mr. GIPSON. That is true, but when we say lateral transmission, we need to better define lateral transmission and put lateral transmission in the definition as we have it today, not as we viewed it when we started the program. And part of the problem today is that we are using terms that are defined in old terminology in terms of what was known about the disease compared to what is known about the disease today.

In terms of lateral transmission, when you speak with most producers about the disease, or people who have not dealt with the disease, they think that lateral transmission is my sitting next to my colleagues and giving them the disease. But that is not lateral transmission.

Mr. OLIN. What is lateral transmission?

Mr. GIPSON. Lateral transmission, as we have defined it within the scrapie program with the research that we have conducted, is the transmission that occurs at the time, or immediately after birth, when there is close contact between the offspring and the parent, which may be infected with scrapie. And that is because the organism, at time of birth, is in very high concentration in the afterbirth, and that is primarily where the transmission occurs, basically by oral ingestion.

Mr. OLIN. It is transmission from the afterbirth to the newborn lamb?

Mr. GIPSON. Right, precisely. But initially lateral transmission was thought to mean, if I have it and I sneeze, the other person can get it, or something of that nature. We know that that does not occur.

So if we put it in that context when we say "lateral transmission," then we are better able to deal with what we are seeing with the disease today.

Mr. OLIN. Why is that different from bloodline, if you are going to eradicate the whole bloodline, if it is well identified, you will have covered that other subject, will you not have?

Mr. GIPSON. We would have covered lateral transmission?

Mr. OLIN. The way you described it.

Mr. GIPSON. That is precisely right, and that is why initially we went to the bloodline program to preserve those valuable lines, just based on that, but also that lateral transmission, before it was defined that way, was confused with vertical transmission, because based on some of the latest information we have today, depending on how you define vertical transmission, there is no vertical transmission in terms of from the mother to the offspring at the time of conception or fertilization.

Mr. OLIN. So that the fact of the matter is that you depopulate based on bloodline unless there are not good records kept so you can't identify the bloodline.

Mr. GIPSON. Right, that is just one of the factors that go into it.

Mr. OLIN. Is it true that in the cases where you can't identify the bloodline you depopulate 100 percent; is that true?

Mr. GIPSON. Say it again.

Mr. OLIN. Where you cannot clearly define the bloodline——

Mr. GIPSON. That you depopulate 100 percent?

Mr. OLIN. You depopulate 100 percent; is that true?

Mr. GIPSON. That is one of the criteria, that is correct, sir.

Mr. OLIN. Is that absolutely true in all cases, what I just said?

Mr. GIPSON. Not in all cases, because if the owner does not want total flock depopulation, it is not something we can force. It is kind of a voluntary type program.

Mr. OLIN. You do not order depopulation?

Mr. GIPSON. We cannot force depopulation.

Mr. OLIN. Dr. Glosser, you said you did, to me. What is going on here? I hate to be mean like this, but I don't like to get false statements made.

Mr. GLOSSER. Mr. Congressman, the regulations permit us to indemnify and depopulate.

Mr. OLIN. All I asked you is what you did. You said you depopulated 100 percent when you got one infected animal. That is what you told me. Now, what is the case? What is the fact?

Mr. GLOSSER. Sir, I mentioned that if we do the cost/benefit study, the analysis that Dr. Gipson just went through shows we should. We have the authority and the regulations to do 100-percent depopulation of a flock if it is voluntary, if it works under the State statutes, and it has to be with total agreement to be successful. Dr. Gipson is absolutely right that we have no authority under our regulations at this time to order the elimination of a total flock.

Mr. OLIN. So you don't have much of a program going, that is what it comes down to.

Mr. GLOSSER. That is exactly right, sir.

Mr. OLIN. You don't have much of a program, so why in the world are you opposed to coming up with a bill that would require you to develop a program? That doesn't make sense.

Mr. GLOSSER. Because we have no scientific criteria for a control or eradication program.

Mr. OLIN. But then you don't want to put more money into the research to get the answers to these things.

Mr. GLOSSER. No, we are not opposed to research at all.

Mr. OLIN. Is this identified positively as a virus, or is it, as you described originally, an organism? Is there any difference between those two things?

Mr. GLOSSER. There is.

Mr. OLIN. You called it an organism. I take that to be some kind of a bug or an animal or bacteria.

Mr. GLOSSER. That is correct, under the broad classification, an organism includes——

Mr. OLIN. A virus is something different.

Mr. GLOSSER. A virus is part of that microorganism and a virus particle.

Mr. OLIN. Would you tell us what you do know, positively, and what you don't know with regard to this. It is confusing, as Mr. Gunderson was saying. I would like to see you remove the confusion.

Mr. GLOSSER. I would like to be able to remove that confusion, not only to the committee's edification but to mine.

Mr. OLIN. Well, could one of your people describe to what extent you have identified what this thing is that is causing the disease.

Mr. GLOSSER. I would like to, if I may, call on Dr. Robinson, who is a molecular biologist, to take it from there, and we can go into the field if you would care to.

Mr. OLIN. Fine, thank you. Dr. Robinson.

Mr. ROBINSON. It is difficult to answer your question in a positive sense. It is considered to be a microorganism, which would include bacteria and viruses, but it is a very small microorganism, smaller probably than the smallest known virus, and so some people refer to it as a subviral pathogen, just talking about size.

We cannot identify the pathogen by microscopic means. It is not visible to us, it is not apparent, even with electron microscopy, which is the best tool that we have for a morphologic study. And the biochemical characteristics of the pathogen are very confusing. They are not consistent with any known microorganism. We have had very tantalizing leads over the last 10 years as to what it is composed of, but all the leads end up taking us into areas of biochemistry and molecular biology where we don't even really have any definitions. And there is a lot of confusion as to what exactly the pathogen is composed of and what is required for lateral transmission or experimental infection with that pathogen.

Mr. OLIN. All right. Thank you very much. Thank you, Mr. Chairman.

Mr. STENHOLM. Dr. Glosser, why did APHIS suspend the scrapie indemnification program during the current fiscal year?

Mr. GLOSSER. In the current fiscal year, approximately $250,000.

Mr. STENHOLM. Why did you suspend the program?

Mr. GLOSSER. Why did we—we ran out of money, sir.

Mr. STENHOLM. It seems to me, in your response to all of the questioning, that lack of funds has been the major problem. You have stated several times this morning that your opposition to the bill before us is that we don't have the tools. The tools that you would like to have are preclinical diagnostic tests.

On page 2, line 22 of the bill, if we said, "The Secretary of Agriculture shall establish and carry out a program to attempt to control and eradicate the disease of scrapie," you wouldn't object to this bill?

Mr. GLOSSER. It certainly is an improvement over the mandatory direction as the bill is written today. We feel that the Secretary has the discretion to approach this problem, to support the research and the cooperation with the State and industry that is needed.

Mr. STENHOLM. I read this bill three times trying to find the reason for your strong objection. I had a difficult time finding your objection, because I did not read in the bill what you had read into it until I reviewed page 2.

Mr. GLOSSER. It is a mandatory program, sir, without any basis of eradication.

Mr. STENHOLM. However, if you say, "A mandatory program to attempt to control and eradicate," that might soften your opposition to the bill.

We have already plowed this ground, and I just wanted to touch on it again, because we talked about New Zealand and Australia and the reason that they were successful, they caught it early and it was a few animals. And we have got a much bigger problem in this country and therefore it will be much more expensive and dollars are, in fact, going to be the problem.

Mr. GLOSSER. Depopulation is a very important tool in the eradication, ultimate eradication, of any disease. But I still have to go back to the fact that if you have no basis of establishing the clinical epidemiologic case, you are really basically eradicating populations and probably are taking care of all the infection, but you have no basis of knowing where do you stop and where do you delineate the exposure. That is the whole problem.

Mr. STENHOLM. How much money is currently being spent by APHIS to develop a preclinical diagnostic test.

In some cases you identify USDA's contribution, in others you do not. I assume that that means somebody else is paying for it?

Mr. GLOSSER. That is correct.

Mr. STENHOLM. For example, University of California received $90,000 last year.

Mr. GLOSSER. Per year.

Mr. STENHOLM. The NIH is developing a diagnostic test. Who is funding that research?

Mr. GLOSSER. We believe the National Institutes of Health is funding this for basic research.

Mr. STENHOLM. Do you have any coordination or consultation with them on this particular research effort?

Mr. GLOSSER. Yes, we do. Our researchers are in constant communication with them.

Mr. STENHOLM. You have identified where USDA can best spend its APHIS research dollars.

Mr. GLOSSER. And where public funds, to the best of our knowledge, are going in, yes, we have.

Mr. STENHOLM. Would you have recommendations regarding the authorization of additional scientific research projects that in your

judgment and those of your peers who have worked on finding a cure for scrapie.

Mr. GLOSSER. I personally have asked my research colleagues how soon can you get a diagnostic test, how long is it going to take, and how many dollars, and that is a terribly unfair issue.

Certainly, the more that you can identify the virus particle, the prion, or whatever you wish to call it, if you can diagnose that and detect it very early, I would say a DNA probe, that is the thrust of this type of research.

Another area that is very fruitful, in my mind as a generalist, is what I would call genetic fingerprinting, to be able to ascertain or put on a gradient scale those animals that are most susceptible, those that are not, those who may have a genetic predisposition.

Mr. Chairman, I would like to defer to an expert in the areas of where the best dollars could be done for a preclinical test and other research.

Mr. STENHOLM. If you were going to take a bare bones approach and start a steady process of moving to developing a preclinical test, how much might it cost?

Mr. ROBINSON. Within my own experience, which is within the Agricultural Research Service, we are the only—at Washington State University, which is our location—we are the only research group working with the mission of development of a preclinical diagnostic test. And we spend directly on research—we have an appropriation to the project of approximately $240,000 per year over a 5-year period, but after salaries and overhead come out of that, the actual amount of money that is spent on the project is probably between $70,000 to $90,000 per year.

Within my own experience, I could very easily, and have, design experiments which would cost, just for the goods and services to work toward a preclinical diagnostic test, between $300,000 to $400,000 a year. That would be for animals and reagents.

Within the scrapie research community—and this is just conjecture—it is something that I thought about since Dr. Glosser asked me the question. I would say that it would be between $2 million to $4 million, spread around among competitive cooperative laboratories, principally the people who are already working on scrapie who have a strong history in the field, and that this money be administered through a competitive proposal type of situation, because the approaches to scrapie, to the understanding of the biology of the disease and to detection of the agent, are going to require some very novel thinking.

Tried and true practices have not worked and the competitive proposal type of funding has in the past been the best approach to this type of scientific research. You have not only the generation of new ideas, but you also have a true experimental type of environment.

Right now, scrapie is a somewhat politicized field of research and that is partly because it is poorly funded. And if there was more funding, then I think there would be more cooperation between all of the laboratories working on this problem.

Mr. STENHOLM. Are either of you aware of any potential side benefit of an effort like we are discussing today with regard to other diseases?

Mr. ROBINSON. There are several diseases in ruminants which are very similar to scrapie—bovine spongiform encephalopathy in Great Britain, chronic wasting of mule deer and elk, which are wild animals and of which we know very little about the actual prevalence of that disease.

And there is a possibility—I think it will be spoken about in later testimony—that there is a problem within cattle that may be in the United States and which may be related to or similar to scrapie, not necessarily directly related.

Within human health, scrapie in its clinical form is similar to diseases called Creutsfeldt-Jakob disease and Kuru, and a diagnostic test, a preclinical diagnostic test for scrapie, would probably further our understanding of the pathogenesis of this disease and also in developing a similar detection system for what are human health problems of some concern.

Mr. STENHOLM. Any further questions?

Mr. GLOSSER. Mr. Chairman?

Mr. STENHOLM. Yes, sir.

Mr. GLOSSER. Dr. Gipson could provide some additional insight on your last question?

Mr. STENHOLM. Please.

Mr. GIPSON. In discussing the industry, there are two problems that we are confronted with, and I would first of all start out by addressing total flock depopulation and why we feel like that would not work.

History has shown us, with other total flock depopulation programs, that we did not get the cooperation that we needed from industry because we were taking entirely too many animals. Not only were we taking too many animals, but we were defeating the purpose of eradicating the disease based on the current technology and some of the things available to us today.

And one important thing that has come out of some of the studies that we have been conducting over the past 25 years goes back to our redefining vertical and lateral transmission. And some of the preliminary information that we have today regarding the mode of transmission and the lack of it being transmitted vertically is embryo transfer. And that is something that we need to look at today.

Our ultimate goal is not only to eradicate scrapie, but to provide a meaningful service to the industry. If you take a look at embryo transfer, based on the information we have today, that is one way of beginning to get some scrapie-free flocks. That needs to be pursued further. And it could be pursued in such a way that the owners would get a benefit as that develops.

Mr. STENHOLM. Excuse me, could you repeat your last comment?

Mr. GIPSON. Embryo transfer.

Mr. STENHOLM. Explain that a little further.

Mr. GIPSON. I am sure it will be discussed in further testimony, but the information out of studies that we have conducted at Mission would indicate that you can break the transmission of scrapie by transferring the embryos. And if that is in fact true, we need to pursue that. And that is one way of our industry getting some scrapie-free flocks, but it is expensive.

The other area that we have engaged in some tentative research agreements is that we know that the disease is caused by the ability of the animal to express or manifest clinical signs of the disease, is controlled by genes. And you have a long incubation gene and a short incubation gene. And the animals with the long incubation gene can probably go through their life and never express the disease.

So another area we could look at is that there has been a probe developed that can identify the long and short incubation gene. If we took some of that and put it toward that technology and began to look at identifying those animals that are resistant while we are looking at developing the diagnostic test for the disease, we can, in fact, be developing resistant animals as well as looking for preclinical tests, which again is providing that service that the industry needs.

And the third area that has caused the program to fail is the area of animal identification, permanent animal identification. Until we can address that area alone, it is going to be difficult to have any type of effective eradication program, even with a preclinical diagnostic test.

Those would be some areas that we should consider as practical in terms of making some accomplishment with reference to research.

Mr. STENHOLM. For the benefit of the subcommittee, would you explain what actions are being taken to prevent any additional animal pests from entering the United States?

Mr. GLOSSER. At the present time, Mr. Chairman, we are holding a public hearing in Connecticut on August 17, to receive views on the management, the potential diseases, parasites, to learn more information about ostriches, of which there is very little knowledge in this continent, to solicit views as to proper management, quarantine provisions, how do you handle these birds, and also to assure the proper treatment for elimination or cleaning up of these birds before they come into the United States, interception, if you will.

We do not wish to have an occurrence like we had in identifying five exotic ticks based on, I would have to say, inadequate treatment procedures. We want to determine what are quarantine procedures, what our treatment procedures, mitigating procedures are before we import any additional birds. And we will respond appropriately with more precision in our import regulation.

The animals that were involved, the birds that are involved that had the tick infestations are all under quarantine, have been treated three times. They are awaiting the fourth treatment, and we are doing environmental studies to make sure that these ticks have not established into the ecosystem of the surrounding area.

Mr. STENHOLM. Just yesterday my office received several phone calls indicating that Mexico has made a decision to disallow any live sheep imports from the United States. At this point, do we have any confirmed information which might explain this recent decision by the Mexican Government?

Mr. GLOSSER. I also received notification that Mexico approximately 2 weeks ago has closed its borders to the importation of sheep. I made queries of the industry areas, I have officially contacted our ag counselor in Mexico City, and have asked for a

formal interpretation, whether the Ministry of Agriculture, whether this was a governmental issue or whether it was a private isolated issue.

We don't have information at this time; as soon as I do have further information, I will provide you with what we know. It is of concern to us that without notification—as I say, the early information I had with one of my Mexican contacts said that this was not a governmental action. However, I want to confirm that.

Mr. STENHOLM. I would appreciate you sharing what you find out with us as soon as possible.

Dr. Chaddock, we haven't heard from you. I don't want to ignore you totally. Do you have anything that you would like to add?

Mr. CHADDOCK. Thank you, Mr. Chairman. I just would like a couple moments to say that from the State regulatory standpoint, the current scrapie program, which we in Michigan have been cooperating with APHIS over the past probably 25 years, certainly has not eradicated the disease.

As Dr. Glosser has already stated, the tools to eradicate the disease of scrapie are not available to us. And also, the cooperation, or total cooperation, from the industry, and their frustrations because of not having these tools to adequately help them, has also been a factor in not being able to eradicate that disease.

I am not going to take up anymore of your time, other than to say that certainly we need more funds, a lot more funds, in the research aspect of this disease so that we can have these tools to help our industries, but just to continue to add indemnity funds to a fatally flawed program that we are dealing with today is not the answer.

Mr. STENHOLM. Thank you very much, all of you gentlemen. We appreciate you being here and we probably are going to be in touch on this issue.

Mr. GLOSSER. Thank you, Mr. Chairman.

Mr. STENHOLM. We will call panel three, Philip Bradshaw and Ms. Howard. I understand panel five has a schedule problem. Therefore, let's ask Mr. Wasson and Mr. Dial to approach the table at this time and we will hear the four of you together at this time.

## STATEMENT OF PHILIP E. BRADSHAW, PRESIDENT, UNITED STATES ANIMAL HEALTH ASSOCIATION, ACCOMPANIED BY MICHELE C. HOWARD, CHAIRMAN, SHEEP AND GOAT COMMITTEE

Mr. BRADSHAW. Mr. Chairman, first of all, thanks for the opportunity to be here today. I wanted to say to you that I am not an authority on scrapie. What I would like to do today is, I would like to just basically state the general position that the United States Animal Health Association has on this issue.

Mr. STENHOLM. I might just add that you are not alone this morning, from the testimony that we have already heard.

Mr. BRADSHAW. Well, I think as the morning goes on we see the difficulty which some of us have that work in these areas. But my written comments contain a letter from Ms. Michele Howard, who is chairwoman of our sheep and goats committee, and she is much more familiar with the scrapie program than I. Ms. Howard, as you

are aware, is here with me today and will be available for any of those questions that you might have that I couldn't answer.

What I would like to do at this time is to read the position statement that the United States Animal Health Association established in October 1988.

Scrapie in the United States has a negative impact on the future of the sheep industry, and scrapie presents a barrier to the exportation of sheep and goat germ plasm. The most effective program to eradicate scrapie would be to eliminate all infected and exposed sheep. This would cost the USDA millions of dollars and would not be acceptable to the sheep industry today.

So this is what we resolved to do.

Be it resolved that the United States Animal Health Association recommends that the USDA redirect their efforts and funding towards a certification program, education of producers and veterinarians, and research support for preclinical diagnosis of scrapie and the use of embryo transfer to prevent scrapie.

Be it further resolved that the United States Animal Health Association recommends that the present scrapie program not be abolished until a new control program, coordinated by USDA, and jointly developed by State, Federal and industry representatives, is implemented.

That is our official position as of today. Now, I would like to say, we understand the budget constraints that all Government programs must operate under. Protecting the health of our animals is crucial to our supply of food and fiber. The cost for animal health programs have historically given good benefit to cost ratios and I believe, Mr. Chairman, you brought this to our attention in our opening remarks.

We do not want to support this bill if it is at the expense of other animal health programs. I think it is very important that we look at the benefits for the total animal health industry.

Animal health programs in general need to be strengthened. One only needs to look at many other countries around the world to see the benefit that society, the consuming public, and farmers are reaping from our past programs. The adding of brucellosis, pseudorabies, scrapie, and others to the list of those diseases that have been eradicated, such as foot and mouth, hog cholera, et cetera, will give our animal owners in future generations funds that would have been used to treat and control this disease.

We certainly support—and I want to make this clear to the committee—we certainly support a control program and a program for scrapie in the United States.

Ms. Howard has just now joined me.

Mr. STENHOLM. Thank you. Ms. Howard, we will recognize you.

## STATEMENT OF MICHELE C. HOWARD, CHAIRMAN, SHEEP AND GOAT COMMITTEE, UNITED STATES ANIMAL HEALTH ASSOCIATION

Ms. HOWARD. Thank you, Mr. Chairman, and—I don't see any committee members, but tell them when they come back that we addressed them, too.

I thank you for the opportunity to be here today to represent the United States Animal Health Association as chairman of the sheep and goat committee, with our president, Mr. Phil Bradshaw.

I am also representing the California Wool Growers Association where I served as executive vice president for 16 years, and I am a producer of Suffolk sheep. We run 500 sheep in California. I also

serve as a member of the Secretary's Advisory Committee on Foreign Animal and Poultry Diseases. I have worked with representatives of the sheep industry and researchers for over 12 years on this problem of scrapie, and I would like to emphasize that the sheep industry and USDA do need an effective program to control and, hopefully, eradicate scrapie.

We feel that more emphasis needs to be used on research and education so that we can develop a diagnostic tool to detect scrapie before the animals have to be killed, and that we need to do further research in the form of embryo transfer so that we can develop sheep that are resistant to scrapie and have these in our flocks.

Education is also a very important part of this research and the industry has to be educated and play a very supportive role to make any program work. Wherever you have a program mandated that property must be condemned, you need an indemnification program, no matter what form; I personally feel in a limited form, but you need one.

In order to have this program, any program on scrapie, succeed, we are going to have to have the cooperation of the industry, cooperation of the Federal Government, cooperation of the State governments. And at this time, this is on a voluntary basis and we don't have many of those who do cooperate with the Federal Government, and we need a permanent identification system.

As a sheep breeder and a representative of different sheep organizations, we must have a bill, and I'm here today asking that we do have a bill and let us iron out the differences and work this out when we put together the guidelines on how this program should work.

And I would just like to close by saying I would be very happy to answer your question, do we need more funding on research? Yes, we do, we need more money for research so that we can develop a diagnostic tool and so that we can do more work on embryo transfer so that we can get scrapie-resistant type sheep. Thank you.

Mr. OLIN [acting chairman]. Fine thank you. I lost track of—were you the first one to speak on this panel?

Mr. BRADSHAW. No. I'm the president of the United States Animal Health Association and I read an opening statement, but having limited knowledge on scrapie, I relinquished my time to Ms. Michele Howard who chairs our committee.

Mr. OLIN. Do you have anything else to say?

Mr. BRADSHAW. Well, I would like to just make one other comment, briefly.

Mr. OLIN. Go ahead.

Mr. BRADSHAW. I think we heard in the opening remarks from members of the committee about the importance of animal health programs and the cost/benefit ratio these have shown over the years. I think what we are really discussing here this morning is what benefit will scrapie eradication have to the United States, and I think there is no question, when you look at past history, it would be a very valuable thing, when you look ahead, to get this matter resolved.

I think our differences here is just in the matter of how we approach it. So I think we want to keep looking, and as president and here on behalf of the Animal Health Organization, I am represent-

ing all species and all health programs. I have to emphasize that what we need is additional funding for all health programs, not just scrapie.

[The prepared statement of Mr. Bradshaw appears at the conclusion of the hearing.]

Mr. OLIN. Fine, thank you. Mr. Dial.

**STATEMENT OF DWIGHT DIAL, MEMBER, EXECUTIVE BOARD, AMERICAN SHEEP INDUSTRY ASSOCIATION, ACCOMPANIED BY RODGER WASSON, EXECUTIVE DIRECTOR**

Mr. DIAL. Mr. Chairman, my name is Dwight Dial, and I am a sheep producer from Lake City, Iowa. Like Charley, we raise hogs, sheep, corn and soybeans, but today I am here in Washington representing the American Sheep Industry Association and the more than 115,000 sheep men and women across our country.

I serve on the executive board of the American Sheep Industry Association. I would like to talk to the committee about the devastating disease known as scrapie. Scrapie is a disease that is incurable and for which there is no live animal diagnosis, which we have heard about from previous witnesses today.

The current outbreak has already ravaged flocks across the country with no controllable end in sight. The disease outbreak has not only been devastating to individual producers who have been victim to its attack, but it threatens the viability of our industry. For the individual producer, when the disease occurs in a flock, the options become frustrating and confusing, which we have demonstrated today in Charley's case.

The USDA has an indemnity program, but it is out of funds. The flock is quarantined if scrapie is diagnosed, which not only destroys the credibility of the flock, it limits the options that a producer has for destroying and removing of those animals.

For the industry, the disease is threatening the expansion that is presently underway, both in numbers and in our quality of our product. Both the market and Congress have encouraged our industry to grow in both numbers and in quality. To do so, leading sheep men search the Nation for top quality animals to bring into their flock for genetic improvement. With a disease, though, that can incubate for years before manifesting itself, how can the industry be secure when purchasing breeding stock?

The American sheep industry has been concerned about scrapie for sometime. They have been working with USDA's Animal and Plant Health Inspection Service in their scrapie eradication program to bring the disease under control. However, last year it became obvious that the program was inadequate. At a meeting of the industry members it was decided that as an association our approach to controlling scrapie would need to be twofold. First, we agreed to sponsor an effort to assemble a team of scientific experts to gather all available information and research on this serious disease. Our thought was that this information would enable us to make more intelligent decisions as we look at industrywide control and eradication options, the results of which will be discussed by witnesses that will follow us.

In addition, our association leadership sat down with APHIS officials to determine what they felt was the best strategy for eradicating scrapie. The USDA suggested that the negotiated rulemaking process would be the best solution. The industry agreed to this approach in November 1988, but still does not have a set date from APHIS for the rulemaking process to start.

As recently as July 12, 1989, APHIS has publicly reiterated its interest in conducting negotiated rulemaking. In a press release, the USDA announced that it will continue the present scrapie program until a revised or alternative program can be considered. But once again, no date for initiation of the rulemaking process was given.

Sheep producers in this country are now seriously concerned that a negotiated rulemaking process will take too long to be effective. There are many sheep on farms and ranches across the country that have been exposed and are at high risk for both contracting the scrapie disease, and spreading it.

Today there are sheep that are showing clinical signs of scrapie awaiting death and possibly contaminating other animals on the land that they live. Because APHIS has no funds to deal with scrapie infected animals, these serious conditions still continue. We understand that we are fighting a disease for which there are few answers, that we are facing a disease that is growing rapidly and has the potential to devastate our entire industry.

It is for that reason that we come before you as a unified industry in the support of H.R. 799, Congressman Leach's Scrapie Eradication Act. We feel that it is in the national interest, not only to the sheep industry but also to the consumers of this country, to bring the disease under some control through a workable indemnity program and increased funding for scrapie research immediately.

Thank you, Mr. Chairman, and I will be open for any questions, and so will our executive director of the American Sheep Industry Association, Mr. Wasson.

[The prepared statement of Mr. Dial appears at the conclusion of the hearing.]

Mr. OLIN. Thank you, Mr. Dial.

Did you have anything to add at this point, Mr. Wasson?

Mr. WASSON. Yes, thank you, Mr. Chairman, just a brief comment if I might.

It has been suggested that there are differences of opinion, and I suppose there are. It has been suggested that the industry is divided on the issue, and I would just like to set the record straight that there has been considerable debate. We have had committees that have been working on this issue.

The American Sheep Industry Association was formed just this last January by the merger of two previous national associations that you have heard of. The National Wool Growers Association, which has been here in Washington since 1865, merged with the American Sheep Producers Council. The new organization had several committees that worked on this issue. The issue was debated and a resolution passed by our board of directors and by the entire membership. That resolution is a little bit lengthy, so I will not read it, but it is included in the information.

One bottom line in the resolution is that there is support for an indemnity, and I think that the bottom line agreement that we have within our industry is, yes, we do need expanded research, the questions that have been identified have to be addressed.

We also support indemnity. We will work with APHIS on the negotiated rulemaking procedure, but there is agreement that we need to do something now as well. It was mentioned earlier today that there exists the opportunity for this program and this problem to be addressed without legislation. Our concern is it hasn't been addressed, and we feel that the legislation is a step in the right direction and we strongly support it.

Thank you.

Mr. OLIN. Let me ask the members of the panel a few questions.

First, Mr. Wasson, could you tell me a little bit more about—your new association was formed, let's say about the turn of the year, is that right?

Mr. WASSON. That is right.

Mr. OLIN. How many members do you have?

Mr. WASSON. We are a federation of States and there are 34 State associations that make up the American Sheep Industry Association.

Mr. OLIN. Does that cover all the States with sheep?

Mr. WASSON. Virtually all States, there are some States that have small numbers of sheep that are not currently affiliated that we have communications with.

Mr. OLIN. Is Virginia one of your members?

Mr. WASSON. Oh, yes, Virginia is one of our strong members.

Mr. OLIN. You don't have an approximate number of the sheep farmers that are covered, or ranchers?

Mr. WASSON. We are supported by over 100,000 sheep producers in the United States.

Mr. OLIN. And give me some idea of the total number of sheep that are on our ranges, how many sheep in the Nation?

Mr. WASSON. We have a little over 9 million sheep in the United States.

Mr. OLIN. Nine million. And do you have any kind of a reading on how widespread this disease is among that 9 million sheep?

Mr. WASSON. I think that some of the scientists that we have coming up on the next panel could be specific, but I do know that there was the opinion at one stage that this was a problem primarily isolated to one or two States in the Midwest, and I believe that the records that APHIS has shows that it is considerably more widespread than that and it is now throughout the country.

It also had been suggested that it was limited to one breed, and they also confirmed that that is not the case, that it is showing up in a number of breeds. It had been suggested that only black face sheep had the problem, but it has been confirmed now that it isn't limited to black face sheep, that white face sheep have it as well.

Mr. OLIN. The APHIS people indicated their concern that the industry would not support this effort. What do you think it is going to take to get the full cooperation of the industry?

Mr. WASSON. Well, I disagree that the industry wouldn't support this. Certainly if we have 120,000 people that raise sheep in the United States, there are going to be some more cooperative, I sup-

pose, as individuals, than others. I think when we look at our State associations and our national association, there is support of the effort and I think a commitment will be made on our part to make sure that there is an extensive education program, and in our industry communications, to promote the support and cooperation with Government officials.

Mr. OLIN. Could any of the rest of you comment on this? Ms. Howard.

Ms. HOWARD. I would like to follow-up on what Mr. Wasson has said. I think what APHIS is talking about as far as support is concerned, it is hard for our people to put down animals that they have spent 20 years developing and have them killed when they don't know for sure that these animals do have the disease. This is why we have to have a diagnostic tool, so that we know ahead of time.

As far as cooperation is concerned, our industry will cooperate. But when you talk about the numbers of sheep, I feel that we are talking about over 2 million sheep now. If you are going to do a job of eradication, and eradication talks about vertical and lateral transmission, then to do the job effectively, we are going to have to put these animals down, and I don't think that the people are going to be willing to lose their bloodlines that they have developed—and this just isn't a monetary thing, these people love these animals, and I think this is where, when you say the noncooperation, we are not willing to have all our animals killed until we have the research to tell us if these animals are in fact infected with the disease.

Mr. OLIN. Well, the scientists have told us that as hard as they have worked on it, they don't even have any idea where they are going to turn. It is a bad situation we are in.

Ms. HOWARD. I know, and I have worked on research for about 15 years and they are exactly right. We don't know, and that is why we need more money for research on scrapie. Look at what is happening with AIDS, and hopefully we are going to have a breakthrough and we can't give up and we have to work on research in various areas. But I know the industry will cooperate.

Mr. OLIN. One of the techniques that APHIS has used, as you know, is eradication. I was heavily involved in this avian flu outbreak in my State 4 or 5 years ago, and we literally buried millions of birds. And in that case it turned out they didn't know really—well, they had different strains of a virus, but they didn't know how to inoculate for the virus, they couldn't do much about it except sanitize and finally get rid of it.

And so the program was to kill birds and to increase the sanitation, decrease the intrusion of any outsiders where the birds were, and over a period of a couple of years they got rid of the disease and they are still free from it.

I think the problem here you are going to have is that you can wait for the research until we can really pin this thing down and know by some easy test whether the animals have it or not, but you might be in a position where that might take years to occur.

Is the industry in a position where they would, for example, be willing to identify any sick or dead animal for the purpose of being tested and then possibly proceeding with eradication, not knowing

for sure how far you would have to go or just what you are getting into?

Ms. HOWARD. I think most of our people would, but I think it comes to a point of legislating morality, and you always have the one or two people who are very aware of scrapie and instead of reporting it, they are going to eliminate the animal behind the barn. But I don't think there are many of those people and the majority of our industry will cooperate with the Federal Government and the State government and do all they can to help eliminate this problem.

And I want to say, this isn't only a problem of the sheep industry, this is a problem of USDA and we need this problem taken care of because we need to export sheep overseas, too, so it benefits every consumer and everybody, just not the sheep industry.

Mr. OLIN. What kind of mortality does an ordinary sheep grower encounter?

Ms. HOWARD. From scrapie?

Mr. OLIN. No, from whatever reason, you don't know what the reasons are. What is typical?

Ms. HOWARD. Well, do you want me to tell you what they tell us, or what we think is true? It depends on if it is pneumonia or what. But, hopefully, we are hoping that it is not over 2 to 5 percent.

Mr. OLIN. Two to 5 percent.

Mr. Dial, do you have a number on that?

Mr. DIAL. If it is from natural causes and not predation problems, Ms. Howard is probably in the ballpark. I would say running around 5 percent, but in cases where you get into the predation problem, it can exceed in some States, 40 percent of their production annually. And from the farm flock State that you are from, you could probably look at running at 5 to 8 percent of the lamb crop due to natural causes.

I would like to, if I might, Mr. Chairman, make a statement, too, where we are headed. You hit upon the idea that eradication, if we wait for the diagnostic tool to come about and ignore the indemnification and eradication procedures, as you said, we may be opening this thing up to spread even further.

I think that is the key thing we need right now. If we are going to control it, we need to put some teeth into the program so that we can stop the spread.

Mr. OLIN. You also need quite a bit of money. If you have 9 million animals and they are going to go at $500 a head, that takes a lot of money.

Mr. DIAL. Well, I don't think we are looking at—we are not looking at 9 million—right now animals exposed total 12,000 head.

Mr. OLIN. It would wipe out the USDA altogether.

Mr. DIAL. That is an entire wipeout. I don't think we are talking about 9 million head.

Mr. OLIN. Well, you are not going to have that, obviously, but it might be sizable. That is the thing, you don't know.

Mr. DIAL. If it continues it could very well devastate the entire industry.

Mr. OLIN. Mr. Wasson.

Mr. WASSON. Mr. Chairman, I think that, as was pointed out, again, by APHIS, they have the ability right now to work on in-

demnification. They haven't been indemnifying whole herd because, as Dr. Glosser mentioned this morning, they have run out of money.

I think the thing that we have got in front of us right now is that there are some herds that we know have the disease. It has been diagnosed, it is very hot in the herd, such as Mr. Swaim, and he is not the only one in that category, who would be willing to have their herds totally depopulated, but there are no funds to work with.

In the meantime, those people's neighbors and others in the industry are getting very concerned. They are appreciative that those individuals are willing to destroy their herds if there were indemnity funds available, but instead, without it, there certainly is the temptation for some people to let those sheep reenter commerce and show up in the sale barn. And that is the ticking time bottom, too, that concerns us. That may not in itself be an eradication program, but there is a control tool of indemnity that is available that is not being used. And again, as Dr. Glosser said, it is that they have run out of funds and they haven't been able to do it.

Mr. OLIN. Of course, you also have the problem of repopulation. What do you know about the quality of the repopulation, wherever you get it. Maybe you have to go over to New Zealand and Australia, I don't know.

Mr. WASSON. Mr. Chairman, I think with that in mind, the other suggestion that we will be bringing up a little bit later is the possibility of working on a certification program for certified scrapie-free herds, and we have some suggestions that can move in that direction. So with the combined tool of having the indemnity available to us, as well as the certification-free program, I think we can deal with it.

Mr. Chairman, one other comment on the question that you raised earlier about how widespread it was, and you asked of the situation in Virginia. There are 14 cases currently in the State of Virginia that have been diagnosed as having scrapie.

Mr. OLIN. That is news to me. Up until this week, I had never heard of the subject, never been brought up in talking to sheep growers or livestock people. Incidentally, I was just handed a—it says that one of these testimonies says the projected number of exposed flocks for the current year is 260, totaling 15,000 sheep. I guess Dr. Glosser said that, estimated there might be as many as 5,000 sheep should be depopulated this year at a cost of $1.5 million.

Maybe that testimony is coming, but it would indicate that at least the Department thinks that we might have a more aggressive program that could be contained with regard to the number of animals and the cost, and that could be—I am not sure whether they are thinking about regionalizing it, or going by States, or some other scheme which would not involve exposure of the whole Nation until you figured out whether you were making any headway or not.

Certainly in the case of the avian flu, that was localized and we had a huge program between a couple of States, but that is as far as it got and we stopped the traffic in and out of that area, so

except for wild birds, there was no way to spread it. And some kind of a similar scheme might be developed in the case of sheep.

Let me ask you two more questions. One, Mr. Wasson, what amount of industry dollars are currently spent annually for scrapie research, do you know?

Mr. WASSON. If I could, could we refer that to the next panel because they are involved in the research and, Mr. Chairman, I don't have the answer to that question.

Mr. OLIN. All right, we will hold that one.

Mr. Dial, several witnessess this morning have indicated their support for a certification scrapie-free flock program. In your opinion, could this become an effective option?

Mr. DIAL. Without indemnification, I don't feel that a scrapie-free certification program would be effective. I feel that a scrapie-free program would be effective with the indemnification, and one of the areas that you are going to hear more about is embryo transfer. I think that is probably the key factor in creating the pure scrapie-free animal.

Mr. OLIN. Embryo transfer, this is removing the embryo from an animal and entering it into a different animal, is that what you are talking about?

Mr. DIAL. Right.

Mr. OLIN. This is a fertilized embryo?

Mr. DIAL. Right. It breaks the contact or the spread of the disease, and with the research that we presently have, we have that capability of doing that. And I think once we start to address the pure, clean fetus and bring it into production, and then developing scrapie-free operations——

Mr. OLIN. You are saying that the disease cannot exist in the embryo, is that what you are saying? Is that a known fact?

Mr. DIAL. That is what has been presented by the previous panel, Dr. Gipson and Dr. Robinson, in their testimony, and that is all we have to go on as producers, that it does not transmit——

Mr. OLIN. I don't know whether they made that as an absolute statement, I suspect they didn't, but they certainly gave the go ahead for that procedure.

Mr. DIAL. Dr. Foote, I think will address that in the next panel.

Mr. OLIN. Ms. Howard.

Ms. HOWARD. Maybe I could help Mr. Dial out. There are certain strains of sheep that have a longer incubation period toward the scrapie virus, and if the period is 12 years, the sheep would probably die in 7 or 8 years, so they would die before they would be able to carry it and transmit it, and that is what we are looking for.

Mr. OLIN. All right. Is there anything else the panel would like to add before we go on to the next panel?

Mr. BRADSHAW. Mr. Chairman, I might just make one comment. As I said earlier, when you look at the animal health programs in general, the first responsibility we have is stop the spread of this disease, or anything. So the first thing we have got to do in this case is find a way that we can protect those animals that are not infected or exposed. And I am not that familiar with the program, but that is in keeping with our general bylines of our organization.

We have got to stop the spread of the disease and keep it under control.

Mr. OLIN. Let me ask you one more question. Would the industry support a checkoff program to help support the eradication activity, some kind of an assessment?

Mr. DIAL. Right now, the financial constraints that we have from checking off within the industry right now are very limited. I mean, the funds are very tight and when you go into checking off on a national basis, I don't know. I really question——

Mr. OLIN. Well, that sort of gets to the point of what the industry is willing to put into this thing. It is nice to have the USDA come up with $500 per animal, but the general public might like to see some evidence that the industry is willing to make an investment.

Ms. HOWARD. Mr. Chairman, let me expound on what Mr. Dial has said.

The industry in the past, when we have needed seed money for these different research projects, the industry has backed this. In California we realized that the sheep industry had a problem with bluetongue. I believe that the administrator from APHIS said that there is some bluetongue research going on.

We have about 1,500 producers in California. We are not nearly as large as the dairy industry or the cattle industry, but we came up with $85,000 and presented it to the State department of food and agriculture as seed money. And I can only speak on behalf of the California Wool Growers Association, but I feel I can speak on behalf of the USAHA sheep and goats committee and myself, and I think as far as coming up with something like seed money to help with this problem, that the industry is not adverse to it.

So the industry is willing financially. When you talk about a mandatory checkoff program, then none of us can sit here and talk for the other members of the industry.

Mr. OLIN. Those programs usually are voted on by the industry and not mandated by the Congress.

Ms. HOWARD. That is correct.

Mr. WASSON. One final comment on that. Our current self-help program that we have nationally is a check off on the Wool Act and in our Wool Act incentive program. And that currently doesn't allow for us to do research.

The industry currently has another committee that is investigating the feasibility of a national lamb check off, and that is being explored. If that were developed, I would assume that research capabilities might exist then, as do in some other industries.

Mr. OLIN. OK, that is useful. I think I would like to thank you all for your testimony and move to the next panel.

Ms. HOWARD. Mr. Chairman, I want to thank you and tell you that we are going to be back. If you haven't seen enough of us, we will come back and talk to you more often.

And I want also to thank APHIS because they have said they will continue a program until we have a more effective one in line, and we are going to hold them to it and we appreciate their cooperation, too.

Mr. OLIN. Fine, thank you all.

If we could have the next panel, Mr. Paul Rodgers, Dr. Warren Foote, and Dr. R.F. Marsh.

We have got another vote, but I think we expect our regular chairman back here shortly.

I will just take you in the order they are listed on my sheet here. Mr. Rodgers, will start off.

**STATEMENT OF PAUL E. RODGERS, PRODUCER SERVICES DIRECTOR, SHEEP INDUSTRY DEVELOPMENT PROGRAM, INC., AMERICAN SHEEP INDUSTRY ASSOCIATION**

Mr. RODGERS. Thank you, Mr. Chairman. Good morning, and I want to thank you for the opportunity to come here and testify before you. I submitted, earlier, copies of a gray book, a report, that I hope has been distributed.

Mr. OLIN. We have that. We all have copies.

Mr. RODGERS. If you need additional copies, we will be happy to provide those.

I am director of producer services for the American Sheep Industry Association and for the sheep industry development program. The sheep industry development program is the educational arm of the U.S. sheep industry and it is financed entirely by our sheep producers across the country.

As we have heard repeatedly this morning, in comparison with most other sheep diseases, very little is known about scrapie. This lack of information has over the years permitted a great deal of tolerance for conjecture, supposition, and even misinformation. This, in turn, has brought about everything from apathy, on one extreme, to fear and alarm on the other. Unfortunately, there is evidence of both of these extremes in the history of scrapie regulatory programs.

In considering alternatives for scrapie and its eradication, sheep producers expressed widespread concern over this lack of compiled objective information. As a result, they called upon the sheep industry development program, their industry organization, to prepare some information and make it viral to the entire sheep industry.

Well, in January of this year an expert taskforce was formed, made up of scientists, educators, regulatory personnel, and sheep producers. This taskforce was asked to collect, review, and summarize the current knowledge on scrapie and include a review of State and Federal regulatory programs. The results of this effort are presented in the attached report that I mentioned just 1 minute ago, the "Report of the Scientific Advisory Subcommittee to the Scrapie Task Force."

It has an extensive bibliography in it, and we believe has good consensus among the scientific community on what we know about scrapie. No attempt was made to recommend or advise policymakers on how to formulate effective regulatory programs in this document, but rather to offer an information base from which both the industry and Government can make intelligent decisions.

The American Sheep Industry Association, as you have heard, representing the interest of the sheep industry nationwide, has and will be available to make other specific recommendations regarding

the regulations and the funding. The sheep industry feels very strongly that if all the current scientific information is not effectively utilized in the formulation of regulatory programs for scrapie eradication, it will do more long-term damage to this industry than if we simply set back and did nothing.

While there continues to be some aspects of scrapie that are not yet understood, a great deal has recently been learned. The report describes what most scientists agree to be the etiology, pathogenesis, and epidemiology of scrapie and lists a history of the U.S. regulatory programs that have dealt with it.

The report was extensively reviewed by scientists, sheep producers, and regulatory officials alike, and their comments were carefully considered in the preparation of the final manuscript. Those that have testified before you previously this morning I believe have all had a chance to review this document and send in written comments. Those were incorporated into its final form.

This report will be used as a basis for both an educational program for sheep producers that we will conduct, and the development of recommendations for new eradication efforts.

Both of the gentlemen with me today are principal authors of the report and are available to you to expand upon any of its aspects. I think both of them will mention a couple of new tools that have been referred to this morning that would be useful in a new regulatory program for eradication. And I will certainly be here to answer other questions after they have offered statements, if that is OK.

[The prepared statement of Mr. Rodgers appears at the conclusion of the hearing.]

Mr. OLIN. OK, thank you, Mr. Rodgers.

Dr. Foote, you are next.

## STATEMENT OF WARREN C. FOOTE, PROFESSOR OF ANIMAL PHYSIOLOGY, DEPARTMENT OF ANIMAL, DAIRY, AND VETERINARY SCIENCES, UTAH STATE UNIVERSITY

Mr. FOOTE. Thank you, Mr. Chairman. I am pleased to be here today to address the issue regarding scrapie and the U.S. sheep industry. I am a professor of animal physiology in the department of animal, dairy and veterinary sciences at Utah State University, a member of the task force for SID, as just indicated, contributing to this document, and also a member of the sheep and goat committee for the U.S. Animal Health Association.

As a scientist, I have worked for about 35 years in research and development in sheep and goats. For 10 years I have been involved through Utah State University in cooperative research with USDA and the State of Utah, dealing with the transmission of scrapie, primarily vertical transmission, using embryo transfer.

Much of the material that I have planned to present has been mentioned. I am going to still go through point by point, if it is agreeable with you, sir, to get the points underlined.

Mr. OLIN. That would be fine.

Mr. FOOTE. First, I want to go on record that a continuing scrapie eradication program, in my opinion, is essential, but the present scrapie eradication program has not been effective, is not effective,

and although there are many unanswered important questions concerning scrapie, I believe that the required information is available to initiate an effective program. I support bill H.R. 799, the Scrapie Eradication Act as a means to the end of accomplishing control of scrapie.

I would like to submit the following information in reference to these opening statements. Scrapie is an infectious disease. The scrapie agent has not been identified. Scrapie is transmitted laterally from animal to animal in a flock. It is probably transmitted orally, and the greatest incident results from exposure of the offspring at the time of birth and during the first few months following birth.

Scrapie does not appear to be transmitted vertically, when we limit the definition of vertical transmission to the time from fertilization, when the embryo is formed, to the initiation of the birth process at the end of pregnancy. Our work with embryo transfer has shown this, and that embryo transfer, therefore, can be an effective tool in breaking the scrapie transmission chain.

Available information is unclear concerning the infectivity of the contaminated premises. The incredible resistance of the scrapie agent to destruction and the potentially high concentration of the scrapie agent that might occur in areas such as the lambing area, require that we be very cautious concerning our conclusions. There are ways, however, that we can deal with this problem.

Susceptibility or resistance to scrapie in terms of a short or long incubation period is determined genetically. A gene probe has been developed at Edinburgh, Scotland, which makes possible determining whether an animal has a long or short incubation period. We will be involved in testing this probe. This would allow selection for animals with long incubation periods which constitutes resistance to the disease. There are, however, complicating factors because of some of the complexities of scrapie.

There is no preclinical test for scrapie and the period of time until the procedure will be developed cannot be predicted. Mouse assay of tissue such as mesenteric lymph nodes does provide limited screening procedures in the live animal for the presence of the scrapie agent. However, this does take at least 1½ years to complete. To date, scrapie is not a disease of goats. Only one goat, as far as I can tell, has ever been diagnosed with scrapie in the United States.

The current eradication program, as I have mentioned, has not been effective. In my opinion, this has been due to problems in all of the agencies and organizations involved, with the Federal and State agencies, with associated livestock agencies, and with the producers themselves. This is not an overall condemnation. It is not a condemnation. It is simply a statement of the factors, I think, as they have contributed to the problem.

Mr. OLIN. If I could interrupt you, Mr. Foote, we have a voting problem here. The chairman was going to come back, but I just noticed by my note that there are going to be two votes in series and I have only 5 more minutes to get over there for the first vote, and the second vote will be a short one. So if we could just ask you to pause here and relax for about 10 minutes, or a little bit less, then

the chairman and I will both be back and we can both hear all of your testimony.

Mr. FOOTE. We would appreciate having other members of the committee here.

Mr. OLIN. Yes, I would like to have them here, also, so if you will just stand by, we will be back within about 5 to 10 minutes.

[Recess taken.]

Mr. STENHOLM. The committee will come back to order. Again, I apologize to our witnesses, but this is one of those days.

Dr. Foote, you may proceed.

Mr. FOOTE. Thank you, sir. I wanted to emphasize again that it is essential that an effective scrapie control and eradication program be developed and carried out. The options for doing this are extremely limited. One option that has been suggested is depopulation with indemnity for destroyed animals, and this must be a part of a control and eradication program. It must be only one part, I believe.

We have heard evidence and material given indicating the number of exposed flocks, the number of animals, and so forth, which is very appreciable. And those are a minimum. The majority of flocks with scrapie outbreaks has been the Suffolk breed, but scrapie has also been diagnosed in nine other breeds in the United States. If I am remembering correctly, two other breeds besides the Suffolk are black face breeds, the remaining breeds are white face breeds. So scrapie is not confined to a particular breed or type of sheep in the United States, although most of it does occur in the Suffolk and in the Hampshire breeds.

It is almost impossible to identify all of the exposed flocks to determine which flocks would be depopulated and so forth. Also, depopulation destroys valuable germ plasm and very often the life work of producers.

A certified scrapie-free flock program based on risk reduction procedures can become an effective program, or contribute to such. In this procedure, all points where scrapie might be transmitted are identified and the risk of transmission at each point is minimized. The overall risk then becomes a function of risk at each point. And this, I believe, could essentially be reduced to zero.

The steps, or components, in the risk-reduction procedure might and should include the status of the source flock in regard to scrapie, age of the source animals, germ plasm would be obtained by embryo transfer, possible screening using the mouse inoculation of mesenteric lymph nodes, transfer of the embryo to scrapie-free recipients, and with attention given to the premises, freedom from scrapie from the premises, and then an isolation and surveillance period in which the absence of scrapie could be certified.

If we were to consider this, then such a program could identify and certify, in effect, all breeds and flocks of goats in the United States. They, I believe, could be identified as scrapie-free. And such a program could also certify, in the time limits required, the majority of breeds and flocks of sheep in the United States. So in this process we could go through and say, these are the flocks, these are the breeds and flocks that do not have scrapie.

The use of the certified scrapie-free program provides for salvage of germ plasm from infected flocks. In other words, we don't have

to destroy a person's, a producer's, a family's life work if we use embryo transfer and these other procedures that we have outlined.

Permanent identification is an essential part of a scrapie control program. An ideal method is not currently available, but a method such as hot-iron branding, I believe, can be adequate. I don't believe this needs to hold up initiation of a program. An indispensable component of a successful scrapie control program is commitment and cooperation by all persons and agencies involved. The use of a preclinical diagnosis for scrapie, when it becomes available, would eliminate several of the steps that we have identified in the risk reduction procedure. However, not having a diagnostic tool, in my estimation, does not invalidate the initiation of an effective scrapie control program.

Some forms of risk reduction procedure are presently being utilized by at least one producer to develop a scrapie-free flock, and other producers are investigating and asking about the same procedure. So some producers are taking this route on their own.

In terms of a scrapie control program, let me summarize with these last two or three very brief statements. First, the current scrapie eradication program should continue, in my estimation must continue, in some form until a new program is developed and established. A scrapie eradication program must include some aspects of a depopulation and indemnification program, as well as a scrapie certification program including the risk reduction procedure. And again, the lack of a preclinical diagnostic procedure does not invalidate this.

Major components of this program are embryo transfer and the utilization of a gene probe to determine the resistance of scrapie. Such a program would not only help the domestic sheep industry in terms of development of its flocks, but it would also support an export program, which at this point is lacking, primarily because of the scrapie problem.

Increased research and application efforts is an essential part of a scrapie eradication program. I believe these needs include continued research on preclinical diagnosis of scrapie, the development and testing and application of a gene probe to identify animals genetically resistant to scrapie, continued work on the use of embryo transfer, and on epidemiology with natural scrapie, and continued research on the relationship of scrapie to other spongiform encephalopathies in man and animals, including bovine spongiform encephalopathy in cattle.

Education is critical to a successful scrapie control program. We complain about the things we don't know about, but maybe we are neglecting to provide information on what we do know and how it can be applied. We hope this document on scrapie that we have submitted will help. Education is necessary for all persons involved at all levels. Scrapie research is very dynamic and often controversial. Part of an effective education program is continual update and review.

Thank you.

[The prepared statement of Mr. Foote appears at the conclusion of the hearing.]

Mr. STENHOLM. We will next hear from Dr. Marsh.

## STATEMENT OF R.F. MARSH, PROFESSOR, DEPARTMENT OF VETERINARY SCIENCE, UNIVERSITY OF WISCONSIN-MADISON

Mr. MARSH. Mr. Chairman, as a faculty member of the college of agricultural and life sciences at the University of Wisconsin-Madison, one of our principal missions is to assist the livestock industries in any way that we can, and to make sure that they have a scientifically sound basis for studies and problems they wish to investigate. That is why I welcomed Mr. Rodger's invitation to be a member of the scrapie task force and to participate in the preparation of this document. It is a good document. I hope it is an important informational resource for your committee.

I have given you a letter of testimony today which I think is important. I think it is important that your subcommittee receive testimony from an investigator in the field, and I would like to make specific comments on my personal assessment of the scrapie eradication program as follows:

The major problem of the program is that there is no diagnostic test for the disease in preclinically infected animals. It is impossible to have a successful control or eradication program without a diagnostic test.

In my opinion, the essential part of the transmissible agent is a small nucleic acid which has not yet been identified. If this component can be characterized, sensitive probes could be developed to distinguish infected from noninfected animals. Research on the disease should emphasize these investigations.

The transmissible agent only affects those animals which are genetically susceptible. The discovery and characterization of these susceptibility genes are the most important findings in scrapie research in many years. It is now likely that within the near future it will be possible to test bloodlines of sheep for their susceptibility or resistance to scrapie.

Research should emphasize methods to detect these susceptibility genes, and to make these procedures available to sheep producers so that they can develop resistant bloodlines.

There is no evidence that scrapie represents a public health risk.

There is a new disease in Great Britain called bovine spongiform encephalopathy, BSE, which has been caused by feeding cattle rendered protein concentrates from scrapie-infected sheep. There is no evidence that BSE exists in the United States.

My final comment and recommendation is that we eliminate the scrapie eradication program in favor of a scrapie-free certification plan in which APHIS would cooperate with States and producers to provide gene testing and diagnostic services for clinically affected animals.

Now, having made these comments about the scrapie eradication program, I would also like to tell you that I support H.R. 799, because we desperately need additional monies for research on scrapie.

I would like to see the bill modified so that additional moneys go into the research part of the bill; $2 million is not enough. My university charges 47 percent overhead, meaning that only half of these funds would be used for direct research allocation. That is

only enough to support four or five projects, and there are many, many more good ideas in scrapie research that need to be funded.

So with these comments, then I will be glad to answer any questions that you might have.

[The prepared statement of Mr. Marsh appears at the conclusion of the hearing.]

Mr. STENHOLM. Dr. Foote, could you elaborate on evidence that there is transmission of scrapie not only from a ewe to her lamb, but to other sheep not related to the ewe?

Mr. FOOTE. We mentioned that the highest instance of scrapie in a flock comes from exposure at the time of lambing, associated with lambing. At that time there is very intimate contact between a ewe and her lambs and that ewe and other ewes' lambs as well, depending on how the lambing program is carried out.

So the exposure of other lambs to an infected ewe would occur, as well as to that ewe's own lambs. And the evidence, if we look at the cases that have been traced from one flock to another, shows that very often these animals can be traced back to exposure by another ewe, rather than that animal's own mother at the time of lambing.

Mr. STENHOLM. Do all of you support H.R. 799?

Mr. FOOTE. In my opening statement, I also indicated the same thing. I think you were not here, but I do.

Mr. STENHOLM. Mr. Rodgers.

Mr. RODGERS. Yes, absolutely sir.

Mr. STENHOLM. If you were here earlier, you heard me ask Dr. Glosser about their opposition to the bill. I have read and heard here that you also have expressed concern about eradication. Is eradication effective?

Mr. RODGERS. I will start. Yes, I believe so, sir, and these gentlemen have alluded to two new techniques and two new tools that would make an eradication program much more appetizing to the American producer.

One of the tools that Dr. Glosser mentioned that he needs is the preclinical diagnostic test. Of course, we have to recognize that the countries that did eliminate scrapie didn't have that. The reason that we need it is for economic reasons that we need that tool that they didn't have as well. But these two techniques certainly would make it much more appetizing to depopulate in the cases where the agency found it sound economically and epidemiologically.

Mr. STENHOLM. Dr. Marsh, you mentioned a new disease in Great Britain. Is there other possible beneficial effects of a scrapie control program?

Mr. MARSH. The most important part is to keep BSE out of the United States, and one of the reasons for maintaining the program is to keep our surveillance up and prevent the prevalence of scrapie from increasing. Because if this happens, and we get rendered scrapie-infected sheep carcasses into cattle feed, BSE could occur in the United States.

Mr. STENHOLM. Dr. Foote, do you have a comment?

Mr. FOOTE. I believe there are several benefits of this research, side benefits. Scrapie is used to quite an extent, I believe, as a model for studying other spongiform encephalopathies, such as Creutzfeldt-Jakob disease. And I believe a lot of the work that will

be done with scrapie will help us understand better this whole family of diseases, and this certainly can contribute to the similar disease in humans.

Mr. STENHOLM. Mr. Olin.

Mr. OLIN. Thank you, Mr. Chairman. I was quite interested in the testimony of the two university people here. I thought it was quite helpful.

First, on the subject of the magnitude of the research that ought to be going on, could each of you, Dr. Foote and Dr. Marsh, give me some idea of what magnitude in dollars you think would be appropriate; Dr. Marsh, first.

Mr. MARSH. As I indicated in my testimony, we need to get money to study the nature of the agent because, in my opinion, we will not have a preclinical test until we identify the nucleic acid that is the essential component of the transmissible agent.

We have to be able to distinguish infected from noninfected animals. This is an important part. The most exciting new evidence in scrapie, though, is identifying these resistance genes, and they are very far along in Edinburgh, Scotland in characterizing these genes and being able to test for them.

I would say within two years we should have some type of a laboratory test available to determine which bloodlines of sheep are resistant and which are not. We need to carry on research in the United States because we have different bloodlines of sheep here and these need to be tested. We need to get these gene probes, we need to start doing the work ourselves here. I would estimate, since this is very expensive research, it would take all of the $2 million which you have in this bill for just the gene testing development.

Mr. OLIN. Dr. Foote, what are your comments?

Mr. FOOTE. We recognize the problems with research, getting information about scrapie. And I think the first thing we have to realize is that this is a long term research undertaking, and it is not just $2 million or $5 million or $10 million in the next few years, it has to be somewhat of a continuing effort.

The world is small and we will be involved in the research with this probe in a cooperative program with Edinburgh, so we have these opportunities, we have those ties. But the research, the cost—I don't know how to put a dollar sign on it; $2 million is certainly not going to begin to pay the cost. It would be several times that.

Mr. OLIN. Several times that, and sustained for some period of time.

Mr. FOOTE. Yes, an indefinite period of time.

Mr. OLIN. Now, on the idea of certification, I gather that both of you feel that the industry could start to operate a certification program to some extent independent of the research, based on what you know now. Am I taking you correctly, utilizing knowledge of the embryo transfer and——

Mr. FOOTE. I believe that.

Mr. OLIN. Do you feel the same way, Dr. Marsh?

Mr. MARSH. As Dr. Glosser said, the program has to be voluntary and it has to be industry and economically driven, and I do not believe that an eradication program can work without a diagnostic test.

Mr. OLIN. You think it is questionable because of the uncertainty of, I guess, the quality of your population you are creating. Is that about right?

Mr. MARSH. By the quality of the population, do you mean?

Mr. OLIN. The population of sheep that—you cannot be absolutely sure that you have a pure strain, uninfected.

Mr. MARSH. No, without a test you cannot. But hopefully we can develop tests for resistance genes in sheep, and if the sheep are resistant to infection, the prevalence of the distribution of the agent is not going to be as important.

Mr. OLIN. You can improve your odds considerably if you get a resistant strain.

Mr. MARSH. Absolutely. I think this is the best thing we can do for the industry with what we currently have available.

Mr. OLIN. That is a program that would be carried on pretty much by the industry and it would be driven by the economics, people that were willing to go through that process, knowing that when they got done, they would be pretty much free of the disease. Is that about the nature of it?

Mr. MARSH. Hopefully, yes. I think that is what we are all hoping for, and that is what all the research to date indicates.

Mr. OLIN. Dr. Foote.

Mr. FOOTE. I might make just two comments, again. I am referring to the initiation of a control program where we begin to control the disease, not an eradication program at this point.

The other point is that the whole sheep industry is held captive by scrapie to a certain extent. With a certification program, knowing what we do know now, I believe we can take steps to free some segments of the industry from this problem, and this can help not only in saving germ plasm and in allowing the industry to continue to grow and develop, but it can also help a great deal in opening up export markets, because many countries do not allow the export of germ plasm from sheep and goats because of scrapie. And if we can develop our own program of control and show that some of these breeds and flocks are free of scrapie, then I think we are doing the sheep industry another favor, helping them again by increasing and encouraging export.

Mr. OLIN. I take it then that you visualize a program that is agreed upon and that you would start this with some kind of a trial area. You would pick maybe a number of growers in a particular place and work with them to try to achieve what you visualize. Is that about right?

Mr. FOOTE. Something of that nature. There is a lot of discussion——

Mr. OLIN. And then once you have proven you could do it, then you could make it available more broadly.

Mr. FOOTE. Of course.

Mr. OLIN. What size program do you visualize starting with? How large a program is it to get this going?

Mr. FOOTE. OK, now we are back again to a certain amount of indemnity and depopulation, and I am not sure how this should work, and this is something that would need to be a function of this negotiated rulemaking process.

Mr. OLIN. You would have to have indemnity as part of that trial program?

Mr. FOOTE. That is right, I think it has to be a part of it. But I would envision setting up the criteria and then initiating, at least in several flocks in several different States, enough so that we can really get some sense of the involvement, the logistical demands and so forth in terms of size of flocks, distribution in terms of different States. The agencies, again, are a very important factor.

There has to be some way, one policy that is adhered to not only that the Federal Government agrees to, but that each State agrees to with the Federal Government. And this is the problem that exists now, in my understanding, that the States and the Federal Government may or may not agree, and their problems vary, and this limits, then, the effectiveness of a program.

But I would like to see several flocks in several States, different sizes and so forth.

Mr. OLIN. So you are sort of hoping that the Federal Government might take the lead in getting that set up and negotiated with the States and with the industry, then to set a national program within certain confines of what you try to—you would try to accomplish something that could become a model then for broadening.

Mr. FOOTE. Somehow I see five organizations or agencies. One is the Federal Government, the other is the collective State governments, another is the livestock, sheep associated organizations, another is the sheep producers, and the other would be the research community. And they all, I think, have a role to play. And until the producer then is willing to really put all of the cards on the table—and most of them are—all of the cards on the table in terms of their flock records and the accuracy of their flock records, a program isn't going to work.

But if we are talking about a certified program, unless they do put their cards on the table, then they will never become certified, or it is not likely that they could become certified.

Mr. OLIN. I think I understand your proposal. I don't know, Mr. Chairman, I think we are going to want to take a look at this bill and see whether we might broaden its provisions to include the idea of certification and the creation of such an experiment.

I thank you, gentlemen. I think that is about all I have, Mr. Chairman.

Mr. STENHOLM. Do we have any evidence that this disease is regionalized?

Mr. MARSH. Yes, I think it is. It tends to be in California and Texas, major Suffolk growing areas. Out of the 476 flocks which have been diagnosed with scrapie since 1947, over 350 have been Suffolk flocks, so in that sense it tends to be regionalized to the Midwest, Suffolk flocks in California, and somewhat in Texas.

Mr. RODGERS. And I might also comment, I will refer you to page 16 of that booklet that we put together. And without going into the percentages, most of those, the high numbers, are around in the Midwest. And as Dr. Marsh has stated, the higher numbers are in the Suffolk and the black face flocks.

One of the other things that has been—this is not part of a study, that I am aware of, but maybe one of the reasons why we

don't see it show up in some of the western States in the range areas is because of extensive management. We notice things about sheep—in closely managed farm flock conditions you can notice clinical signs. If they are running away from you in the hills and on the range, when an animal gets sick a lot of times it is taken down by a predator and gone unnoticed and you expect higher death losses.

So to say that it is not there wouldn't be true, but to say we don't know is true also.

Mr. FOOTE. May I add one comment to that. I think in line with what Mr. Rodgers has said, the lambing procedures relationship is different under extensive range conditions. In other words, they are not as close, the animals are not as close at lambing time and they are handled quite differently. And so the chance of exposure, or effective exposure, I think would be reduced, also, under those conditions.

Mr. STENHOLM. I don't believe I have any additional questions at this time. We thank you all very much. You have certainly given us something to think about as we ponder what we do next. You have given us some very excellent testimony and I concur with what Mr. Olin said in his ending remarks.

We thank you for being here and we look forward to working with you in the days ahead.

If there is no objection, at this point in the record I would like to submit a letter from Mr. Olin Timm of the California Wool Growers Association, dated July 21, 1989, and also a letter from Mr. Harold Hartley, director, commodity and marketing division of the American Farm Bureau Federation, dated July 20, 1989.

If there is nothing else to come before this hearing, I declare it now adjourned.

[Whereupon, at 12:45 p.m., the subcommittee was adjourned, subject to the call of the Chair.]

[Material submitted for inclusion in the record follows:]

Statement by
Representative Jim Leach
before the
Subcommittee on Livestock, Dairy, and Poultry
July 27, 1989

Mr. Chairman, thank you for the opportunity to appear before your subcommittee in support of H.R. 799, the Scrapie Eradication Act.

With me is Mr. Charles Swaim, a leading sheep producer from Iowa, whose flock has been infected with scrapie. He and his family have been active in the fight against scrapie and I appreciate the Subcommittee's courtesy in allowing Mr. Swaim to appear with me. In a microcosm the story we are presenting is a story of a farmer and a farmer's daughter. The farmer's flock has contracted scrapie. The farmer's daughter has become the country's leading librarian of scientific literature on scrapie, precipitating a review of general veterinary concerns and practices.

Although not a new disease, we know surprisingly little about scrapie. What we do know is that it is a disease which attacks the central nervous systems of sheep and goats, has no known cure, and can not be detected until the infected animal begins displaying symptoms.

The symptoms include weight loss, scratching and itching, and unsteadiness. Sheep less than two years old may not show any signs of it, but the incubation period can last as long as six to eight years.

The agent that causes scrapie and the method of its transmission are not known, but it can affect all breeds of sheep and goats. Further, at present there is no diagnostic test for the disease that does not involve destruction of the animal. The only way a positive diagnosis can be made is to examine brain tissue from a euthanized animal. It is because of these unknowns that the spread of scrapie represents a potential catastrophe for the sheep and goat industry.

Of the 115,500 flocks in the United States today, 190 have been exposed to scrapie and are under scrapie surveillance. These 190 flocks contain approximately 12,000 animals. At least 45 of these flocks are known to be infected.

To effectively control scrapie a combined effort by producers, farm organizations, state governments, the USDA and Congress will be required. I hope the Subcommittee on Dairy, Livestock, and Poultry will consider H.R. 799 as part of this effort.

The bill would provide for the indemnification of the owners of infected sheep and goats destroyed in a scrapie eradication program after an appraisal of the value of the animals involved, with the amount per animal capped at $500 or 80 percent of the fair market value of the animal, whichever is less.

The research program proposed by the bill would be aimed at developing methods of detecting the disease before infected animals begin displaying symptoms; would attempt to develop methods to treat, prevent and cure scrapie; and would seek a method to control transmission of the disease, which a study conducted by the USDA in Texas indicates may spread both vertically -- through bloodlines -- and possibly laterally, among flocks.

-- more --

At issue is whether we are going to follow the British-Australian model of animal eradication or continue to allow on-farm incentives to shield the depth of the problem. Because the disease, unlike those more common in the livestock industry, has agents which an Icelandic study indicates may prove to embed themselves in farm ground and property long after infected sheep are removed, the long-term implications of what seems a small problem today could be magnified.

In addition, while the scientific evidence is conflicting, a British study indicates the possibility the disease may have variants which may spread to other kinds of livestock, thus raising the specter of a rather extraordinary effect on a broader spectrum of the meat industry. In this context, it would appear particularly prudent to move rapidly toward both a new eradication program where the disease is found and a research program to find a cure in order to ensure its future containment.

At stake is the credibility of our food safety standards. As a nation we are known for the rigorous requirements we place on the producers and processors of our food supply. It is in our national interest to act quickly to ensure that our overseas customers can be confident that the meat they buy from us is totally wholesome. If our domestic markets for lamb become jeopardized by an "alar-like" scare, sheep exporting countries like New Zealand and Great Britain can be expected to consider retaliation with non-tariff food examination barriers where we have a competitive trade advantage.

Even the most restrained theories of government hold that governments should assist where individuals and small groups cannot help themselves. Biomedical and veterinary medical research are two of those areas where the government can help provide protection for farmers from forces beyond their control, and where the outcome can provide protection for the populace as a whole.

Again, I appreciate the opportunity to appear before you and commend you for your concern for this growing problem.

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STATEMENT OF CHARLES D. SWAIM, JR.,
SHEEP PRODUCER
BEFORE THE HOUSE COMMITTEE ON AGRICULTURE
SUBCOMMITTEE ON LIVESTOCK, DAIRY, AND POULTRY
ON SCRAPIE ERADICATION PROGRAM

JULY 27, 1989

Mr. Chairman and members of the subcommittee, it is an honor to appear before you today to give testimony concerning the Scrapie Eradication Program. I am appearing at the hearing primarily as a sheep producer with a personal interest in scrapie, and secondarily as a representative of the sheep industry.

My family and I operate a farm of approximately 1000 acres in southeast Iowa. We manage over 100 head of beef cattle in addition to approximately 1000 registered Suffolk and Hampshire sheep. We began our sheep business in 1959 with a commercial ewe operation. In 1965 we started breeding purebred Suffolk sheep. We have strived to improve our flock by purchasing rams and ewes from top breeders throughout the United States for the past twenty years. As a result of professional management practices, Swaim Suffolk Farm became known as one of the top breeders in the world. We had an impressive show and sale record with momentum increasing each year. Raising sheep has been our livelihood.

Our flock was placed on quarantine for scrapie in October, 1988. At that time we were lead to believe that scrapie was nothing more than a bloodline disease due to the bloodline guidelines followed by the current scrapie program. As soon as

we found out that scrapie is contagious as well as genetically linked, we realized our operation was doomed. This was the beginning of a quest for information and investigation into past scrapie research.

Scrapie is a transmissible disease in sheep and goats. The disease was acknowledged in Great Britain more than 200 years ago. Since that time scrapie has been found in more than twenty other countries, including Canada, France, Iceland, Italy, Kenya, and the United States. Australia and New Zealand have also been victims of scrapie, but were able to eradicate the disease by method of flock depopulation. They are now considered scrapie-free.

Expansion upon a few of the important dates in the history of scrapie will help clarify how the United States has handled the disease:

*1947 - Scrapie was first diagnosed in the U.S. from a Michigan flock.

*1952 - Additional U.S. flocks with scrapie were found in California. The U.S. Secretary of Agriculture declared an emergency, thus providing the means for establishing the Scrapie Eradication Program.

*1957 - The State-Federal Scrapie Eradication Program was broadened to include slaughter of source flocks as well as infected flocks and exposed sheep moved from both source and infected flocks and their immediate progeny. This expansion was due to the observation that scrapie could spread over great distances through the normal movements of sheep; i.e., one flock had disseminated the disease into more than thirteen other flocks.

*1959 - A special scrapie meeting was held by the Agricultural Research Service, USDA.

*1964 - A scrapie seminar was held in Washington, D.C. and attended by industry representatives, world authorities, scientists, and regulatory officials.

*1968 - A hearing was held by the Committee on Agriculture in the House of Representatives concerning whether to eliminate the scrapie program. The bill failed and the program continued.

*1975 - Sheep and goats exposed to scrapie were banned from slaughter for human food consumption due to health concerns.

*1979 - Observations and experiments were published from research beginning in 1964 in Mission, Texas. The study showed that scrapie spreads from flock to flock, state to state, or from country to country by movement of infected, but apparently normal sheep which were incubating the disease but had not yet reached the age of clinical manifestation. Therefore, transmission is lateral (horizontal) and/or genetic (vertical).

*1983 - The Scrapie Eradication Program was amended to a program of destroying only animals with a direct bloodline relationship to an affected animal. All other animals in an infected flock are required to be permanently identified as scrapie-exposed and maintained under surveillance for 42 months. This was later amended to allow for total flock depopulation when found to be more cost effective than maintaining a heavily infected flock under surveillance.

The nature of scrapie and the difficulty of the problem can be summarized into five major areas:

(1) High contagion rate. Scrapie is highly contagious, especially under conditions at the time of lambing (birth). It can be passed from sheep to sheep and from sheep to goats by contact experiments. Great Britain has shown passage from sheep to cattle due to inadequate rendering of sheep offal for feed rations. Scrapie in cattle is known as bovine spongiform encephalopathy (BSE). In the same way it has also been passed to mink by feeding sheep and beef carcasses unfit for human consumption, thus causing transmissible mink encephalopathy (TME). Scrapie-like conditions also occur in deer and elk.

(2) Long incubation period. It is generally believed that two years is the minimum incubation period for scrapie. Due to such a long incubation period without clinical signs, an animal carrying the disease could appear to be normal while infecting and exposing all other animals in the flock. There is no definite maximum age when animals can contract scrapie. These factors make it extremely difficult for producers to predict or detect the existence of scrapie in their flocks.

(3) Limited testing. There is no live animal test to diagnose scrapie. Only post-mortem examinations of the brain at the National Veterinary Services Laboratory, Ames, Iowa, can confirm scrapie. This means that the animal must be showing clinical signs before scrapie would be suspected; therefore, flock exposure would already have taken place.

(4) Terminal nature. Death from scrapie is inevitable. There is no long-term recovery or cure. Oftentimes, death occurs without previous symptoms or warning.

(5) Unanswered research questions. Due to limited research on scrapie there are many uncertainties and unanswered questions. Knowledge about land contamination, cross-species transmission, and analogous human diseases is incomplete. Without absolute answers, we do not know whether eating meat ourselves or feeding it to pets will have the same effect as it did on mink. Kuru and Creutzfeldt-Jakob disease prove that humans are susceptible to this group of diseases and because of the long incubation periods it may be a decade or more before there is complete reassurance that BSE and scrapie cannot cross the species barrier into man. Veterinary medicine can make vital contributions to human medicine if areas such as these are tested.

Since October, 1988, we have gathered much information which only points us in the direction of total flock depopulation. We opened up our situation to APHIS authorities and to the sheep industry, rather than hiding the disease, selling the disease, and spreading the disease further. We are trying to use the program as it was designed to be used - to eradicate scrapie.

We have incurred the costs of feed for these animals while unable to market them. We have incurred the costs of hired labor to get through the heavy months of lambing season. However great these expenses have been monetarily, they may be small compared to the health risks taken by the family. Researchers cannot absolutely say one way or the other whether or not scrapied animals are dangerous or contagious to humans. They can tell you that scrapie is very similar to human diseases of kuru and Creutzfeldt-Jakob. In some cases they are indistinguishable. Therefore, the "cost" of health may be much greater than the unduly burdens of feed and labor costs.

We have submitted thirty-two animals which have tested positive for scrapie. In addition, two have tested scrapie-suspicious and did not qualify for indemnity payment even though they exhibited the same signs and came from the same infected flock. We believe that in total, this is the largest number of infected animals in a flock ever tested in the U.S. A cost-benefit analysis was conducted on the flock due to the high occurence of affected animals. In their study APHIS found that total flock depopulation would be more cost effective than maintaining the flock under surveillance. This would both reduce disease spread and control expenditures. Sufficient funds no longer existed when the analysis was completed, so flock depopulation never took place. In addition, one positive animal was unable to be paid for, along with forty-nine bloodline animals which should have been previously taken.

We continue to have animals exhibit clinical signs of scrapie and several have died since indemnity funds ran out in April. Total flock depopulation is the only rational solution due to the magnitude of contamination in our case.

The United States is in a scrapie crisis. The problem is expanding nearly at an exponential rate. The Scrapie Eradication Program has suffered from inadequate funding, poor management of regulations, and limited research. Since 1983 it has also been impaired with useless bloodline restrictions for a contagious disease, again due to inadequate funds. I doubt there will be any effective "middle ground" when it comes to a scrapie eradication program. Some tough decisions will have to be made. Flock depopulation, farm quarantines (keeping livestock off farms previously contaminated, perhaps by placing these farms in a program similar to our CRP program), preventing exposed animals from entering either the animal or human food chains, developing a fair and effective indemnity program and educating all concern about the disease must be tackled. Only then can we achieve the same scrapie-free status held by New Zealand and Australia. Research is an important part of the future; however, it should not eliminate eradication efforts because too many more people may be hurt prior to research finding answers.

H.R.799 and its counterpart S.723 are steps in the right direction. Each calls for increased funding, flock depopulation,

and research. Without these basic program elements the sheep industry, and possibly the entire red-meat industry due to BSE, is severely threatened.

Thank you again for allowing me to express my views and participate in this hearing. I am especially grateful to Representative Leach for introducing H.R.799 and to co-sponsors of the bill for their support.

Respectfully submitted,

Charles D. Swaim, Jr.
Sheep Producer, Iowa

STATEMENT OF DR. JAMES W. GLOSSER
ADMINISTRATOR, ANIMAL AND PLANT
HEALTH INSPECTION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
BEFORE THE HOUSE COMMITTEE ON AGRICULTURE
SUBCOMMITTEE ON LIVESTOCK, DAIRY, AND POULTRY
JULY 27, 1989

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE, IT IS A PLEASURE TO APPEAR BEFORE YOU TODAY TO PRESENT THE DEPARTMENT OF AGRICULTURE'S (USDA) VIEWS ON H.R. 799, A BILL "TO AUTHORIZE THE SECRETARY OF AGRICULTURE TO ESTABLISH AND CARRY OUT PROGRAMS TO ERADICATE THE DISEASE OF SCRAPIE IN THE SHEEP AND GOAT POPULATIONS OF THE UNITED STATES AND CONDUCT RESEARCH REGARDING SCRAPIE."

H.R. 799 SEEKS TO ADDRESS THE PROBLEM OF SCRAPIE BY (1) DIRECTING THE SECRETARY OF AGRICULTURE TO ESTABLISH AND CARRY OUT A PROGRAM TO CONTROL AND ERADICATE THE DISEASE OF SCRAPIE IN SHEEP AND GOATS AND INDEMNIFY THE OWNERS OF ANY SHEEP OR GOATS DESTROYED UNDER THE PROGRAM; (2) AUTHORIZING THE SECRETARY TO CONSULT, COOPERATE WITH, AND INVOLVE STATE AND LOCAL AGENCIES, FARMERS' ASSOCIATIONS, AND OTHER INTERESTED ORGANIZATIONS AND INDIVIDUALS IN ESTABLISHING AND CARRYING OUT THE PROGRAM; AND (3) DIRECTING THE SECRETARY TO ESTABLISH AND CARRY OUT A PROGRAM OF RESEARCH ON THE DETECTION, TREATMENT, AND SPREAD OF THE DISEASE. THE BILL AUTHORIZES APPROPRIATIONS OF $9 MILLION TO CARRY OUT THE CONTROL AND ERADICATION PROGRAM AND $2 MILLION TO CARRY OUT THE RESEARCH PROBLEM.

THE DEPARTMENT DOES NOT RECOMMEND ENACTMENT OF THIS BILL.

AS YOU KNOW, MR. CHAIRMAN, SCRAPIE IS A FATAL DISEASE OF SHEEP AND GOATS. MORE SPECIFICALLY, IT IS A SLOW VIRUS INFECTION OF SHEEP AND GOATS, ONE OF A GROUP OF TRANSMISSIBLE DISEASES KNOWN AS THE SPONGIFORM ENCEPHALOPATHIES. THE DISEASE DEVELOPS SLOWLY, WITH AN INCUBATION PERIOD THAT GENERALLY LASTS FROM 18 TO 60 MONTHS BUT THAT CAN LAST LONGER. CLINICAL SIGNS INCLUDE MUSCULAR TREMORS, INCOORDINATION, ITCHING, LACK OF LUSTER IN THE ANIMAL'S WOOL, AND IN SOME CASES, LOSS OF APPETITE AND VISIBLE WEIGHT LOSS. GENERALLY, THE PRESENCE OF THE DISEASE REMAINS UNDETECTED UNTIL SIGNS APPEAR, BECAUSE NO TEST IS AVAILABLE FOR DIAGNOSING THE DISEASE IN LIVE ANIMALS.

THE ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS), WHICH IS RESPONSIBLE FOR SCRAPIE CONTROL EFFORTS, CURRENTLY HAS ABOUT 200 FLOCKS UNDER SURVEILLANCE FOR SCRAPIE. WE SPEND ABOUT $850,000 ANNUALLY ON SCRAPIE FROM THE "MISCELLANEOUS DISEASE" LINE ITEM OF THE APHIS BUDGET. THE MISCELLANEOUS DISEASE LINE ITEM OF THE APHIS BUDGET IS UTILIZED TO CONDUCT DISEASE CONTROL AND SURVEILLANCE ACTIVITIES FOR LIVESTOCK DISEASES NOT FUNDED BY DIRECT APPROPRIATIONS. DISEASE ACTIVITIES INCLUDE BLUETONGUE, BOVINE LEUKOSIS, EQUINE INFECTIOUS ANEMIA, CONTAGIOUS EQUINE METRITIS, EQUINE VIRAL ARTERITIS, EQUINE AND BOVINE PIROPLASMOSIS, ANAPLASMOSIS, NEMATODIRUS BATTUS, SCABIES, PARASITIC DISEASES, AND ANY OTHER LIVESTOCK DISEASE WITH WHICH THE AGENCY MAY BECOME INVOLVED. WE ALSO PROVIDE TECHNICAL INFORMATION AND SOME SURVEILLANCE SUPPORT TO PEOPLE INTERESTED IN DISEASES OF PUBLIC HEALTH SIGNIFICANCE SUCH AS

LYME DISEASE, LISTERIOSIS, AND LEISHMANIASIS. OF THE $850,000 SPENT ON SCRAPIE, ABOUT $250,000 IS SPENT ON INDEMNITY PAYMENTS FOR INFECTED AND BLOODLINE-RELATED ANIMALS THAT ARE DEPOPULATED, AND THE OTHER $600,000 IS SPENT ON REGULATORY AND CONTROL PROGRAM ACTIVITIES AND METHODS DEVELOPMENT.

REGARDLESS OF WHETHER IMPROVEMENTS CAN BE MADE IN THE ADMINISTRATION OF THE CURRENT PROGRAM, WE DO NOT BELIEVE SCRAPIE CAN BE EFFECTIVELY ERADICATED UNTIL A DIAGNOSTIC TEST BECOMES AVAILABLE THAT DETECTS THE DISEASE IN THE LIVE ANIMAL BEFORE CLINICAL SIGNS ARE EXHIBITED, UNTIL THE CAUSATIVE AGENT IS IDENTIFIED AND CHARACTERIZED, AND UNTIL THE METHODS OF TRANSMISSION ARE FULLY UNDERSTOOD. TO DEVELOP A GREATER UNDERSTANDING OF THE DISEASE, THE DEPARTMENT'S AGRICULTURAL RESEARCH SERVICE (ARS) AND THE UNIVERSITY OF WISCONSIN ARE CONDUCTING RESEARCH TO DEVELOP A DIAGNOSTIC TEST THAT WILL DETERMINE, BEFORE CLINICAL SIGNS ARE EXHIBITED, WHETHER AN ANIMAL IS INFECTED WITH SCRAPIE. IN ADDITION, THE DEPARTMENT IS WORKING WITH UTAH STATE UNIVERSITY TO LEARN MORE ABOUT THE EPIDEMIOLOGY OF SCRAPIE. OTHER RESEARCH PROJECTS ARE ALSO BEING CONDUCTED, AND WE HAVE INCLUDED A LIST OF THOSE PROJECTS AT THE END OF THE TESTIMONY (ATTACHMENT A). UNTIL SCIENTIFIC RESEARCH RESULTS IN A TEST TO DIAGNOSE SCRAPIE IN THE LIVE ANIMAL BEFORE CLINICAL SIGNS ARE EXHIBITED, A REGULATORY MODIFICATION OF USDA'S CURRENT PROGRAM ACTIVITIES WILL RESULT IN THE MOST EFFECTIVE MEANS OF AMELIORATING THE SCRAPIE PROBLEM. WE HAVE INCLUDED AT THE END OF THE TESTIMONY A PAPER COMPILED BY ARS ABOUT THE CURRENT STATUS OF SCIENCE RELATING TO SCRAPIE (ATTACHMENT B).

EVEN IF WE HAD THE TOOLS TO ERADICATE SCRAPIE EFFECTIVELY, WE BELIEVE THE LEGISLATION IS UNNECESSARY BECAUSE THE OBJECTIVES OF THE BILL CAN BE ACHIEVED UNDER CURRENT AUTHORITY. SECTION 11 OF THE ACT OF MAY 29, 1884 (21 U.S.C. 114A), AMONG OTHER STATUTES, AUTHORIZES THE SECRETARY TO COOPERATE WITH STATES AND THEIR POLITICAL SUBDIVISIONS, FARMERS' ASSOCIATIONS AND SIMILAR ORGANIZATIONS, AND INDIVIDUALS TO CONTROL AND ERADICATE COMMUNICABLE DISEASES OF LIVESTOCK AND POULTRY, INCLUDING SCRAPIE, AND TO PAY CLAIMS GROWING OUT OF THE DESTRUCTION OF ANIMALS AND MATERIALS AFFECTED BY OR EXPOSED TO SUCH DISEASES, IN ACCORDANCE WITH REGULATIONS PRESCRIBED BY THE SECRETARY.

ORIGINALLY, ERADICATION EFFORTS FOCUSED ON DEPOPULATION OF THE AFFECTED FLOCK, EXPOSED ANIMALS SOLD FROM THE FLOCK, AND PROGENY OF EXPOSED ANIMALS. AS KNOWLEDGE WAS GAINED THROUGH RESEARCH ABOUT THE POTENTIAL METHODS OF TRANSMISSION, THE PROGRAM WAS CHANGED ACCORDINGLY. THE MOST RECENT CHANGE IN THE PROGRAM, WHICH OCCURRED IN 1983, EMPHASIZES BLOODLINE DEPOPULATION PRIMARILY ALONG THE FEMALE BLOODLINE. THIS CHANGE WAS MADE AT THE REQUEST OF INDUSTRY TO PRESERVE VALUABLE BLOODLINE ANIMALS AND TO BETTER UTILIZE INDEMNITY FUNDS. WHILE LATERAL SPREAD OF SCRAPIE WAS RECOGNIZED AT THE TIME, THE FEELING WAS THAT THE RISK OF GETTING SCRAPIE BY THIS METHOD WAS MINIMAL. FOR THIS REASON, UNDER THE CURRENT SCRAPIE PROGRAM, ONLY AFFECTED AND BLOODLINE ANIMALS ARE DESTROYED, AND THE REST OF THE FLOCK IS PLACED UNDER SURVEILLANCE. WHEN AN ANIMAL IS DESTROYED, WE PAY A FEDERAL INDEMNITY EQUAL TO TWO-THIRDS OF THE APPRAISED VALUE OF THE ANIMAL, NOT TO EXCEED $300. HOWEVER, UNDER THE CURRENT PROGRAM, THE NUMBER OF FLOCKS AFFECTED WITH SCRAPIE CONTINUES TO INCREASE.

BECAUSE OF CONCERNS ABOUT THE PROGRAM, WE MET IN MAY OF 1988 WITH A PANEL OF REPRESENTATIVES FROM THE SHEEP AND GOAT INDUSTRIES, PUREBRED ASSOCIATIONS, STATE REGULATORY OFFICIALS, AND THE UNITED STATES ANIMAL HEALTH ASSOCIATION. BASED ON THE RECOMMENDATIONS FROM THIS PANEL, APHIS PUBLISHED AN ADVANCE NOTICE OF PROPOSED RULEMAKING TO SOLICIT COMMENTS ON WHETHER OR NOT TO DISCONTINUE THE CURRENT SCRAPIE ERADICATION PROGRAM IN ITS PRESENT FORM. AS A RESULT OF THE COMMENTS RECEIVED ON THE ADVANCE NOTICE, WE HAVE DECIDED TO USE NEGOTIATED RULEMAKING TO INVOLVE INTERESTED PARTIES IN DEVELOPING A WORKABLE SCRAPIE CONTROL PROGRAM. THE SOLUTION TO THIS PROBLEM WILL ONLY BE POSSIBLE WHEN WE HAVE AN ADEQUATE SCIENTIFIC BASIS OF DIAGNOSING THE DISEASE IN THE LIVE ANIMAL. THEN, A SUSTAINED COOPERATIVE EFFORT INVOLVING THE INDUSTRY, THE STATES, AND THE FEDERAL GOVERNMENT WILL BE NECESSARY TO DEVELOP AND MAINTAIN A SUCCESSFUL ERADICATION PROGRAM.

WE APPRECIATE THE OPPORTUNITY TO APPEAR BEFORE YOU TO DISCUSS THE PROBLEM OF SCRAPIE. WE UNDERSTAND THE CONCERN OF PRODUCERS ABOUT THE IMPACT OF THIS SERIOUS DISEASE ON PRODUCTION AND MARKETING, AND WE ASSURE YOU THAT WE WILL CONTINUE TO SUPPORT RESEARCH EFFORTS AND WORK WITH YOU AND INDUSTRY TO DEVELOP A MORE EFFECTIVE APPROACH TO THIS DIFFICULT AND COMPLEX DISEASE.

WE WILL BE HAPPY TO RESPOND TO ANY QUESTIONS FROM THE COMMITTEE.

(Attachments follow:)

ATTACHMENT A

CURRENT SCRAPIE RESEARCH PROJECTS

| ORGANIZATION/CONTACT | DESCRIPTION |
|---|---|
| Department of Neurology<br>University of California<br>Room HSE 781<br>San Francisco, CA 94143<br>Contact: Dr. Stanley Prusiner<br><br>Total Funding: $180,000 over two years.<br>USDA FY 1989 contribution: $90,000 | Attempt to purify and characterize infectious particle responsible for causing scrapie, study its progress, and characterize it biochemically. |
| National Institute of Neurological and Communicative Disorder and Stroke<br>Building 36, Room 4A-15<br>National Institute of Health<br>Bethesda, MD 20892<br>Contact: Dr. Clarence Gibbs<br>(301) 496-4821<br><br>Funding: $600,000 | Analysis of cerebro-spinal fluids using state of the art molecular sequencing technology in attempting to develop a diagnostic test for scrapie. |
| Institutes of Basic Research and Developmental Disorders<br>Staten Island, NY 10314<br>Contact: Dr. Richard Rubenstein<br>(718) 494-5155<br><br>Funding: $122,000 | Rapid processing of brain matter using monochromal antibodies and Western blot analysis to develop diagnostic test for scrapie. Also, use electron-microscopy to detect scrapie-associated fibrils. |
| International Sheep and Goat Institute<br>Utah State University UMC 48<br>Logan, UT 84322<br>Contat: Dr. Warren C. Foote<br>(801) 750-2149<br><br>Total Funding: $226,152<br>USDA FY 1989 contribution: $142,850 | Study scrapie to determine efficacy of embryo transfer in obtaining scrapie-free progeny, and determine vertical transmission of scrapie at time of fertilization. |
| Departement of Veterinary Science<br>University of Wisconsin<br>1655 Linden Drive<br>Madison, WI 53706<br>Contact: Dr. Richard Marsh<br>(608) 262-2618<br><br>Total Funding: $55,521<br>USDA FY 1989 contribution: $42,200 | Evaluation of immunoblotting for Prion protein as a diagnostic test for scrapie. |

Animal Disease Research, ARS-USDA
Washington State University
Unit 337 VS Bld.
Pullman, WA 99114
Contact: Dr. Mark Robinson
(509) 335-6029

Attempting to develop diagnostic test for scrapie using state of the art molecular sequencing technology.

Funding: $274,000

Veterans Administration
Nourse Rogers
Memorial Veteran's Hospital
200 Springs Road
Bedford, MA 01730
Contact: Dr. Duguid
(617) 275-7500

Analysis of cerebro-spinal fluid using state of the art molecular sequencing technology in attempting to develop a diagnostic test for scrapie.

Funding: $100,000

ATTACHMENT B

Scientific Perspectives on Scrapie
United States Department of Agriculture
Agricultural Research Service

Diagnosis

The development of a diagnostic test for scrapie-infected animals is one of the most difficult problems in biomedical science today. Currently, postmortem examination of a sheep, cow, deer, elk, or mink is the only method available for confirming a clinical diagnosis of scrapie and related diseases. No method is available for detecting an infected animal during the preclinical period of infection, which is estimated to last between two to seven years in sheep, or for confirming a clinical diagnosis in a living animal. Assuming a clinical diagnosis of scrapie (i.e., other neurologic diseases with similar clinical signs have been ruled out), postmortem confirmation can be made through four interdependent approaches:

1. Microscopic examination of specific areas of the nervous system can be performed to determine if lesions characteristic of scrapie are present. This examination is based on the proper removal, selection, fixation, and histological treatment of the nervous system tissue immediately after death. Even when the tissue is properly preserved and examined, conclusive evidence of scrapie pathology is not found in all infected animals.

2. Electronmicroscopic examination of nervous system tissue can be performed to detect the presence of scrapie-associated fibrils (SAF) or prion rods. These fibrils are indicative of scrapie infection, but the technology required to demonstrate them is expensive and time consuming. Naturally infected animals may have no detectable SAF, thus the absence of these fibrils does not prove lack of infection.

3. Immunobiochemical examination of nervous system tissue can be performed with monospecific antibody preparations to detect SAF (prion) protein. Detection of this protein is indicative of scrapie infection, but the protein can only be detected after sophisticated biochemical treatment of suspect tissue. Again, the technology required is expensive and time consuming, and the protein is difficult to detect in naturally infected animals.

4. Bioassay of nervous system tissue by intracerebral injection into experimental sheep, goats, or rodents provides strong evidence of scrapie infection. A positive result in bioassay is conclusive, but requires a year or more to obtain and involves a significant expenditure of money and test animals. The sensitivity of this technique is not absolute and a negative bioassay result in the face of positive clinical, microscopic, and/or biochemical evidence, does not rule out scrapie infection.

None of the postmortem examinations described above are effective in curbing the spread of scrapie nor are they practical at the level necessary for confirming a diagnosis in every suspected case of scrapie.

Prospects for the Detection and Eradication of Scrapie

A successful scrapie surveillance and eradication program will depend on the development of a practical diagnostic technique for the preclinical detection of scrapie-infected animals. The detection system must be practical enough to apply to a large number of animals under a variety of conditions and locations. It must be simple enough so that false positives or negatives do not occur frequently. And it must be sensitive enough to detect infection early in the course of the disease. This is because the preclinical period represents by far the longest stage of infection, and lateral transmission to other animals probably occurs months to years before clinical signs develop. Therefore, early detection is necessary to eliminate the infected animal and to prevent further spread of the disease.

Several features of scrapie must be kept in mind to understand the problems that face a regulatory or research agency and the relative lack of progress in the development of a preclinical diagnostic technique:

--Although studied for more than thirty years, the composition and structure of the scrapie agent have not been determined. Experimentally, the scrapie agent does not adhere to the characteristics of any known microorganisms. Several hypotheses about the composition and structure of this pathogen are under intensive investigation in the U.S. and internationally, but the specific characteristics of the pathogen remain unclear.

--Scrapie infection does not provoke any detectable immune response to the scrapie agent. Although an animal may be infected for up to seven years before clinical signs develop, there are no antibodies produced due to the infection that can be measured and are indicative of the infection.

--No scrapie-specific protein or nucleic acid has been found that could provide the basis for a practical immunological or molecular testing system.

--The specific mechanisms of the transmission of scrapie from one animal to another remain unclear. Much of the scientific evidence on this subject relates to what happens in an animal after it is infected. Little is known about when an infected animal is infectious to others.

The successful development of a surveillance and eradication program for any pathogen depends on knowing the physical characteristics of the pathogen, how it is transmitted, the specifics of what it does to the host, and how it can be detected. The first step is detection. Virtually all pathogenic microorganisms have unique proteins or nucleic acids, or provoke an immune response to infection. These attributes provide the means for detection. To date, these attributes have not been identified with respect to the scrapie agent. Thus, a true eradication program is not feasible nor is it realistic to expect a scientific breakthrough in the near future.

Several approaches to the development of preclinical diagnostic technique are currently under investigation in the United States and other countries. These

include increasing the sensitivity of the immunobiochemical test for SAF (prion) protein, identifying other proteins that are specific to or associated with scrapie infection in the nervous and lymphoreticular systems, and identifying nucleic acids that are specific to or associated with infection in the same systems. The nervous system is studied because it is the system in which the scrapie agent replicates to the highest level and causes clinical signs of disease. The lymphoreticular system is studied because it is a site of agent replication and it provides the best avenue for obtaining test samples. For example, one approach is to devise a test procedure that can be performed on a large number of animals using lymph node aspiration. Although the current approaches are wide-ranging and provide the best chances of success by available criteria, all of them have inherent problems and none of them can guarantee success for the reasons discussed below.

The immunobiochemical test for the SAF (prion) protein has been developed over the last six years and relies on the detection of a modified normal cellular protein. Since the immunoreactive form of the protein is not unique to the diseased state, the modification of the protein must be revealed by biochemical processing. In addition, the modified protein is found at extremely low levels outside of the nervous system and, to date, has not been detected until late in the preclinical period. Although the sensitivity of current experimental detection systems for SAF protein have been maximized with the latest available technologies, it is estimated that the sensitivity of this test would have to be increased 100 to 10,000 times over current levels to be of practical value as a preclinical diagnostic technique. Even then, the cost of testing and the competence required for accurate testing would probably necessitate a centralized testing facility.

Identifying a scrapie-specific protein or nucleic acid has been the subject of extensive research for more than thirty years. Virtually every existing biochemical method of investigation has been applied in some fashion in these efforts with few significant results. The dogma of molecular biology requires that the scrapie agent contain at least one of these components, but the best efforts worldwide have failed to identify the unique molecules. Progress in this area will be made only with advent of new investigative technologies or the novel application of existing strategies for the isolation and characterization of infectious pathogens. A significant effort will be required to further our understanding and development of new techniques.

The United States Department of Agriculture (USDA), Agricultural Research Service (ARS) and Animal and Plant Health Inspection Service (APHIS) are actively involved in the basic and applied research directed towards the development of a preclinical diagnostic technique through intramural scientific activities (ARS) and extramural funding of research (APHIS and ARS). In addition, We will continue to explore techniques and findings relevant to scrapie from human health research in the areas of slow virus infections.

Vaccine Development

The concept of vaccine development cannot be applied to scrapie at the current level of understanding. A vaccine stimulates a protective mechanism such that subsequent invasion of a host by a foreign pathogen is aborted. The protective mechanism is dependent on immunologic recognition of the pathogen as non-self. To date there is no evidence that the scrapie agent is recognized as non-self. Furthermore, it is possible that the agent is similar to normal host components and a vaccine to the agent would only serve to turn the host's immune system against the host, causing death of the host through the action of autoantibodies.

In summary, the surveillance and eradication of scrapie are dependent on the development of a diagnostic technique for preclinical scrapie infection. The development of this diagnostic technique is dependent on variables that cannot be properly defined at this time due to the lack of positive scientific evidence in many areas of scrapie research. Therefore, the present prospects for the eradication of scrapie are purely a matter of conjecture.

July 1989

STATEMENT PRESENTED BY
PHILIP E. BRADSHAW, PRESIDENT
UNITED STATES ANIMAL HEALTH ASSOCIATION

TO THE
HOUSE AG SUB-COMMITTEE HEARING
ON SCRAPIE ERADICATION ACT - H.R. 799
JULY 27, 1989

What I would like to present is a general overview and statement of the United States Animal Health Association's position on Scrapie and livestock health programs. My written comments contain a letter from Mrs. Michele Howard, Chairwoman of our Sheep and Goats Committee. She is much more familiar with the Scrapie program than I. Mrs. Howard is with me today to answer any questions you might have and to meet with you and/or your staff later, if this would be helpful.

The United States Animal Health Association's official position on Scrapie as established in October, 1988 is:

> Scrapie in the U.S. has a negative impact on the future of the sheep industry and Scrapie presents a barrier to the exportation of sheep and goat germ plasm.
>
> The most effective program to eradicate Scrapie would be to eliminate all infected and exposed sheep. This would cost USDA millions of dollars and would not be acceptable to the sheep industry.
>
> RESOLUTION:
>
> BE IT RESOLVED that USAHA recommends that USDA redirect their efforts and funding towards a certification program, education of producers and veterinarians, and research support for preclinical diagnosis of Scrapie and the use of embryo transfer to prevent Scrapie.
>
> BE IT FURTHER RESOLVED that USAHA recommends that the present Scrapie Eradication Program not be abolished until a new control program, coordinated by USDA, and jointly developed by state, federal and industry representatives, is implemented.

We understand the budget restraints that all government programs must operate under. Protecting the health of our animal

population is crucial to our supply of food and fiber. The cost for animal health programs have historically given good benefits to cost ratios. We do not want to support this bill if it is at the expense of other animal health programs.

Animal health programs in general need to be strengthened. One only needs to look at many other countries around the world to see the benefit society, the consuming public, and farmers are reaping from our past programs. The adding of Brucellosis, Pseudorabies, Scrapie, and others to the list of those diseases that have been eradicated such as: Foot and Mouth, Hog Cholera, etc., will give our animal owners in future generations funds that would have been used to treat and control these diseases.

We certainly support a program for Scrapie in the United States.

July 18, 1989

Mr. Phil Bradshaw
President
United States Animal Health Assn.
R.R. 1, Box 133
Griggsville, Illinois 62340

Dear Phil:

The following Resolution on Scrapie was submitted by the USAHA Sheep and Goat Committee and approved by USAHA at their annual meeting held in Little Rock, Arkansas October 17-21, 1988.

> BE IT RESOLVED that USAHA recommends that USDA redirect their efforts and funding towards a certification program, education of producers and veterinarians, and research support for pre-clinical diagnosis of Scrapie and the use of embryo transfer to prevent Scrapie.
>
> BE IT FURTHER RESOLVED that USAHA recommends that the present Scrapie Eradication Program not be abolished until a new control program, coordinated by USDA, and jointly developed by state, federal and industry representatives, is implemented.

The following responses answer nine questions you asked me to address during our telephone conversation on July 14, 1989. Phil, I know you are very well informed in this area, and I hope we will have the time to discuss our position with the other representatives testifying on this Bill so we can take a unified stand and do the best job possible for the industry.

1) What is the extent of the current Scrapie outbreak? From October, 1988 - March, 1989, there have been 194 flocks (12,000 sheep) exposed to the Scrapie vector.

2) What is the number of quarantined flocks? The total number of flocks under surveillance and under quarantine would be similar to the total number of exposed flocks. As of March, 1989, there were 194 flocks exposed, consisting of 12,000 animals. It is projected that 260 flocks of sheep, consisting of 15,000 animals, will be exposed by the end of FY 1989 (September 30, 1989). Of the 15,000 exposed, it is estimated that 5,000 head will have to be destroyed.

3) What is the total numer of sheep destroyed and the number of sheep to be removed from flocks by the end of FY 1989? We don't know the actual number of sheep now being destroyed. That information would have to come from the regulatory people (Federal & State level). However, it is projected that the number that would have to be put down by the end of FY 1989 is 5,000.

After consulting with field personnel, producers and animal health specialists, the best conservative estimate of funds needed to finish out FY 1989 (September 30, 1989) under the current program is approximately $1.5 million. This estimate was determined in the following manner:

Average indemnification payment per sheep over the last 3 years is $290 x 5,000 sheep = $1,450,000 (rounded to $1.5 million).

4) What is the current status of the Scrapie Eradication Program at this time? The existing Bloodline Program, established in 1983, is still in effect. However, animals are not being indemnified because of lack of funds. Vet Services still provides support in terms of diagnosis and flock evaluation.

5) What program should be utilized to control Scrapie? A Scrapie Free Certification Program that utilizes permanent animal identification and technology dealing with risk reduction producers, particularly embryo transfer and identification of animals with a long incubation period for the development of Scrapie-free flocks. With permanent animal identification, state cooperation and industry support a program can be developed that will work.

6) Are there benefits for a complete depopulation program? Complete depopulation might eradicate Scrapie, but I don't think it would be acceptable for the following reasons:

a) Even though Scrapie is more prevalent in the Suffolk Breed, it has been diagnosed in the U.S., in Cheviots, Corriedales, Dorsets, Finn Sheep, Hampshires, Merinos, Montadales, Southdowns and some Crossbreds. How would we know which animals to depopulate?

b) The industry would not be willing to have up to half of their sheep destroyed.

c) The Government does not have the funds to indemnify the depopulation of millions of sheep.

7) Is there an indemnification program being considered? How important is it as part of the overall program?
Yes, there is an indemnification program being considered and, yes, it is important, in a limited form, in any program where property is condemned. However, the emphasis of the program should be on research, its application, and education.

8) What progress is being made for developing a way to diagnose Scrapie (in the live animal) and developing a vaccine for its control? Regardless of the research efforts to date, a diagnosis of Scrapie in the preclinical animal does not appear imminent. Based on current technology, development of a vaccine is not plausible because of lack of an immune response to the Scrapie agent.

9) If the current program is not satisfactory, is APHIS developing a program to meet these needs? The current program is not satisfactory. It must be amended or a new program developed. APHIS is working with the industry to develop an effective program through the process of Negotiated Rule Making, but it is estimated that this may take one year to complete.

I will continue to put together any updated information that will add to our testimony.

Sincerely,

MICHELE C. HOWARD, Chairman
U.S.A.H.A. Sheep and Goat Committee

MCH:m

July 31, 1989

The Honorable Charles Stenholm, Chairman
Livestock, Dairy and Poultry Subcommittee
1226 Longworth House Office Building
Washington, D.C. 20515

Attention: Dan Waggoner

Dear Congressman Stenholm:

The attached statement is in response to the question asked by Congressman Olin as to how a certification program could be established, using the research and information we now have available, to begin an effective program to control Scrapie:

Thank you.

Sincerely,

Philip E. Bradshaw
President
United States Animal Health Assn.

Michele C. Howard
Chairman, Sheep & Goat Committee
United States Animal Health Assn.

PEB/MCH/m

Attachment

## STATEMENT OF RESEARCH AND APPLICATION AND METHOD DEVELOPMENT NEEDS

Research and application and method development are essential parts of a successful scrapie control program. This includes basic research such as development of a preclinical diagnostic test, characterization of the scrapie agent, and the relationship of scrapie to bovine spongiform encephalopathy (BSE). Also of paramount importance is application and method development including development of a gene probe for genetic resistance to scrapie, embryo transfer, and epidemiological studies. Applied studies of immediate value to a scrapie program is a test program for scrapie free flock certification using risk reduction procedures.

To meet industry's needs for a scrapie program funds should be allocated to both ARS for basic research and to Veterinary Services for application and method development.

Developing scrapie free flocks using risk reduction procedures developed in the cooperative embryo transfer project; a test program.

OBJECTIVES:

To test procedures for establishing scrapie free flocks using flocks of producers participating in a voluntary program to certify animals free of scrapie.

To provide a workable approach to controlling scrapie using the existing technology.

To provide industry with a scrapie free genetic pool of animals.

To provide industry with breeding stock genetically resistant to scrapie.

To provide industry with a method of preserving (salvaging) superior germ plasm from scrapie infected animals.

To test procedures for permanent identification of individual animals.

To develop and validate a record keeping system for verifying pedigree information required for establishing a scrapie free flock certification program.

PROCEDURES:

The pilot project or test program will involve selected flocks in selected states. It will be conducted under the existing cooperative program between USDA/APHIS/VS and Utah State University. The pilot project will be based on risk reduction procedures including the following; scrapie status in flock of origin, age of animal, gene probe for genetic resistance, embryo transfer technology, scrapie free recipients, scrapie free premises, bioassay of mesenteric lymph nodes of donor animals, isolation and surveillance.

SUPPORT:

USDA Cooperative Program (APHIS/Utah State University) - Responsible for planning and carrying out all phases of the program. Provide laboratory assistance for confirmation of diagnosis and application of bio assay. Assist in developing protocol and monitoring, supervision, surveillance and evaluation of regulatory requirements for a certification program.

Producer - Voluntary participation in terms of access to flocks and adherence to protocol.

Industry (purebred organizations) - voluntary participation in terms of access to records, evaluation of pedigree records, and the evaluation of the record keeping system for flock certification.

State - Voluntary participation in terms of monitoring protocol,

surveillance, and evaluating state regulatory requirements for carrying out a flock certification program.

Cooperating Scientists - Voluntary participation in terms of applying state-of-the-art technology for determining the status of animals and providing technical and diagnostic assistance. This will involve the coordination, utilization and transfer of biotechnology on an international scale to address the scrapie problem in the United States.

A scrapie control program based on flock certification includes both risk reduction procedures and indemnification. The test program outlined above will apply and demonstrate existing and emerging technology in developing scrapie free flocks.

For USDA, APHIS, and VS to successfully carry out this test program, Veterinary Services must have adequate funding and personnel for a minimum of five years under the existing cooperative program.

**TESTIMONY**
**of**
**DWIGHT DIAL**
**AMERICAN SHEEP INDUSTRY ASSOCIATION**

**for**
**HOUSE COMMITTEE ON AGRICULTURE**
**LIVESTOCK, DAIRY AND POULTRY SUBCOMMITTEE**

**JULY 27, 1989**
**SCRAPIE**

Good morning, Mr. Chairman. My name is Dwight Dial, a sheep producer from Lake City, Iowa. Today I am in Washington representing the American Sheep Industry Association and the more than 115,000 sheep men and women across our great country.

Mr. Chairman, I would like to talk to this committee about the devastating disease known as scrapie. Scrapie is a disease that is incurable and for which there is no live animal diagnosis. The current outbreak has already ravaged flocks across the country, with no controllable end in sight.

The disease outbreak has not only been devastating to the individual producers who have been victim to its attack, but it threatens the viability of the entire industry.

For the individual producer, when the disease occurs in a flock, the options become frustrating and confusing. The USDA has an indemnity program, but it is out of funds. The flock is quarantined if scrapie is diagnosed; which not only destroys the creditability of the flock, it limits the options a producer has for destroying and removing the animals.

For the industry, the disease is threatening the expansion that is underway, both in numbers and in quality. Both the market and the Congress has encouraged our industry to grow in both numbers and in quality. To do so, leading sheepmen search the nation for top quality animals to bring into their flock for genetic improvement. Now with a disease that can incubate for years before manifesting itself, how can the industry be secure when purchasing breeding stock?

The American Sheep Industry has been concerned about scrapie for some time. We have been working with USDA's Animal and Plant Health Inspection Service and their scrapie eradication program to bring the disease under control.

However, last year it became obvious that the program was inadequate. At a meeting of industry members it was decided that as an association, our approach to controlling scrapie would need to be two-fold. As a result a statement of policy on scrapie was

drafted and approved by the membership of ASI. That resolution reads as follows:

> Whereas the ASI realizes that the present USDA Scrapie Eradication Program has not been effective, and has not had the important Purebred Breeder acceptance and support that is vital to the success of the program. However, the ASI recognizes that Scrapie is a serious and devastating disease in the sheep industry, and as such we must have a viable USDA Scrapie Control Program. We believe an improved and more effective program should be developed.
>
> Therefore be it resolved that the ASI recommends that the present Scrapie Eradication Program be continued until a new and improved Scrapie Control Program can be developed and implemented in lieu thereof. This new program must include the following features:
>
> The broad support of breed associations, purebred breeders and commercial producers.
>
> An effective and realistic indemnity program.
>
> Uniform enforcement and compliance nationwide.
>
> Implementation of permanent individual animal identification method.
>
> Be it further resolved that the emphasis be given to the following essential aspects of the Scrapie Control Program:
>
> Continue research including development of an early pre-clinical diagnostic test, methods of preventing transmission and generic implications.
>
> Develop and implement an education program to inform the sheep industry and Federal and state regulatory personnel about the disease.
>
> Continue dialogue among the sheep industry, Federal and state regulatory personnel, U.S. Animal Health Association (USAHA), and the research personnel to strengthen the Scrapie Control Program.

We agreed to sponsor an effort to assemble a team of scientific experts to gather all available information and research on this serious disease. Our thought was that this information would enable us to make more intelligent decisions as we look at industry-wide control and eradication options.

The results of this will be discussed by witnesses later this morning.

In addition, our association leadership sat down with APHIS officials to determine what they felt was the best strategy for eradicating scrapie. The USDA suggested that the "negotiated rulemaking" process would be the best solution. The industry agreed to this approach in November of 1988, but still does not have a set date from APHIS for the rulemaking process to start.

As recently as July 12, 1989 APHIS has publicly reiterated its interest in conducting negotiated rulemaking. In a press release the USDA announced that it will continue the present scrapie program until a revised or alternative program can be considered. But once again no date for initiation of the rulemaking was given.

Sheep producers in this country are now seriously concerned that a negotiated rulemaking process will take too long to be effective.

There are many sheep on farms and ranches across the country that have been exposed and are at a high risk for both contracting scrapie and spreading it. Today there are sheep, that are showing clinical signs of scrapie, awaiting death; and possibly contaminating other animals and the land they live on. Because APHIS has no funds to deal with scrapie infected animals, these serious conditions continue.

We understand thac we are fighting a disease for which there are few answers; that we are facing a disease that is growing rapidly and has the potential to devastate our entire industry. It is for that reason that we come before you in support of HR 799, Congressman Leach's Scrapie Eradication Act.

We feel that it is in the national interest-- not only to the sheep industry but also to the consumers-- to bring the disease under some control through a workable indemnity program and increase funding for scrapie research immediately.

Thank you Mr. Chairman, I will be glad to answer any questions that you or the other Members have...

TESTIMONY
OF
PAUL E. RODGERS
PRODUCER SERVICES DIRECTOR
SHEEP INDUSTRY DEVELOPMENT PROGRAM, INC.
AMERICAN SHEEP INDUSTRY ASSOCIATION
BEFORE
HOUSE COMMITTEE ON AGRICULTURE
LIVESTOCK, DAIRY, AND POULTRY SUB-COMMITTEE

JULY 27, 1989
SCRAPIE

Good morning, Mr. Chairman. My name is Paul Rodgers. I am the Director of the Sheep Industry Development Program, the educational arm of the U.S. sheep industry that is financed entirely by sheep producers.

In comparison with most other sheep diseases, very little is known about scrapie. This lack of information has, over the years, permitted a great deal of tolerance for conjecture, supposition and even misinformation. This, in turn, has brought about everything from apathy on one extreme, to fear and alarm on the other. Unfortunately, there is evidence of both of these extremes in the history of scrapie regulatory programs.

In considering alternatives for eradicating scrapie, sheep producers expressed widespread concern over this lack of compiled objective information. As a result, they called upon the Sheep Industry Development Program (SID) to prepare such information and make it available to the entire sheep industry.

In January, 1989, SID formed an expert task force made up of scientists, educators, regulatory personnel and sheep producers. This task force was asked to collect, review and summarize the current knowledge on scrapie and include a review of state and federal regulatory programs. The results of this effort are presented in the attached, Report of the Scientific Advisory Subcommittee to the Scrapie Task Force of the Sheep Industry Development Program, Inc. No attempt was made to recommend or advise policy makers on how to formulate effective regulatory programs, but rather to offer an information base from which both the industry and government can make intelligent decisions. The American Sheep Industry Association, representing the interests of the sheep industry nationwide, will be making specific recommendations regarding the regulations and funding.

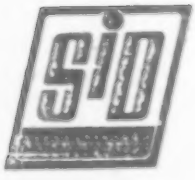
The sheep industry feels strongly that if all current scientific information is not effectively utilized in the formulation of regulatory programs for scrapie eradication, we will do more long-term damage to our industry than if we simply did nothing.

While there continues to be some aspects of scrapie that are not yet understood, a great deal has recently been learned. The attached report describes what most scientists agree to be the etiology, pathogenesis and epidemiology of scrapie, and lists a history of the U.S. regulatory programs that have dealt with it. The report was extensively reviewed by scientists, sheep producers and regulatory officials, and their comments were carefully considered in the preparation of the final manuscript. The report will be used as the basis for both an educational program for sheep producers and for the development of recommendations for new eradication efforts.

(Attachment follows:)

# REPORT OF THE SCIENTIFIC ADVISORY SUBCOMMITTEE TO THE SCRAPIE TASK FORCE OF THE SHEEP INDUSTRY DEVELOPMENT PROGRAM, INC.

JULY, 1989




sheep industry development program, inc.

**Report of the Scientific Advisory Subcommittee to the Scrapie Task Force of the Sheep Industry Development Program, Inc.**

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**Report of the Scientific Advisory Subcommittee to the Scrapie Task Force of the Sheep Industry Development Program, Inc.**
July, 1989

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PREFACE

A Scrapie Task Force has been assembled by the Sheep Industry Development Program, Inc., to evaluate information on the disease. A Scientific Advisory Subcommittee was appointed from this group to write a comprehensive assessment of our current knowledge on the etiology, pathogenesis, and epidemiology of scrapie, as well as a regulatory review. This report was sent out for peer review to scientists, industry leaders, and state and federal regulatory officials.

A. THE DISEASE

I. Description

Scrapie is the prototype of a group of neurodegenerative diseases caused by transmissible agents having properties so unusual that they are called **unconventional viruses**. While these diseases naturally affect a wide range of species, including sheep, goats, mink, mule deer, elk, cattle, and man, they all have the following characteristics:

a. A long incubation period of months or years.

b. A protracted, debilitating neurologic illness that always ends in death.

c. The only pathologic changes seen are microscopic and confined to the central nervous system (CNS). These lesions consist of nerve cell degeneration, microvacuolation of the gray matter (spongiform degeneration), and astrocytic hypertrophy and proliferation.

d. Their transmissible agents elicit no inflammatory or specific immune responses.

2. Related Diseases

Five diseases have clinicopathologic features similar to scrapie:

a. Kuru. A disease of the Fore natives in the Eastern Highlands of Papua New Guinea. The incidence of kuru has dramatically declined since the practice of ritualistic cannibalism was discontinued.

b. Creutzfeldt-Jakob Disease. Also affects humans, but not geographically

limited like kuru. Classified as a presenile dementia having an annual incidence of 1 per one million population. Approximately 90-95% of the cases are sporadic with no known source of risk or exposure, while 5-10% have a familial pattern of occurrence consistent with autosomal dominant inheritance. Both types are transmissible to nonhuman primates.

c. Transmissible Mink Encephalopathy (TME). Rare disease of ranch-reared mink first described by Hartsough and Burger in 1965 (1). Recent evidence suggests that TME may be caused by feeding infected cattle to mink (2).

d. Chronic Wasting Disease of Captive Mule Deer and Elk. First reported by Williams and Young in 1980 (3) after examining brains of mule deer and elk affected with a debilitating disease while held for long periods of time in animal parks or zoos. Not known at this time whether this is a natural infection of deer and elk or whether the animals are exposed after confinement.

e. Bovine Spongiform Encephalopathy (BSE). New disease of dairy cattle in Great Britain that is believed to have been caused by feeding contaminated protein concentrates prepared from scrapie-infected sheep carcasses (4). BSE has been transmitted to laboratory mice and in this regard appears to be similar to scrapie (5).

### 3. Experimental Transmission and Bioassay

Scrapie was first shown to be experimentally transmissible from sheep to sheep in 1936. There followed many years of study confirming the long incubation periods of the disease, but little quantitative data were available until Chandler succeeded in transmitting scrapie to the laboratory mouse in 1961 (6). This mouse bioassay has been extremely important since the scrapie agent does not produce cytopathic effects in any cell culture system, the standard assay for most conventional viruses. The mouse model has also provided important information on the pathogenesis of the infection (7) and on the genetic regulation of the length of the incubation period (8).

Scrapie has also been transmitted experimentally to hamsters, rats, voles, gerbils, mink, and monkeys. The hamster model of scrapie has become widely used in studies characterizing the physicochemical properties of the transmissible agent because of the short incubation periods (8 weeks) and high brain titers of infectivity ($10^{10}LD_{50}$ per gram) in this species (9).

## B. INCIDENCE

### 1. Worldwide

Scrapie was first recognized as a disease of sheep in Great Britain and other countries of Western Europe over two hundred years ago. Specifically, it has been reported in Australia, Austria, Belgium, Bulgaria, Canada, Columbia, England, France, Germany, Hungary, Iceland, India, Ireland, New Zealand, Northern Ireland, Norway, Poland, the Republic of South Africa, Scotland, Spain, Somalia, Switzerland, the United Arab Emirates, the United States, and Yemen. However, although scrapie may not have been officially reported in other countries, they are not regarded as scrapie-free by U.S. import standards. The only countries recognized by the United States as scrapie-free are Australia and New Zealand where the disease was eradicated after outbreaks in 1952 and 1954 (10).

### 2. United States

In 1947, the first case of scrapie in the United States was diagnosed in Michigan. These sheep were of British origin imported from Canada over a period of several years. From this initial case in 1947 until 1988, scrapie has been diagnosed in 438 flocks throughout the country. As of March 31, 1989, 87 cases have been diagnosed in 38 flocks.

The attached map (p. 16) depicts the distribution of infected flocks by states. As of June 22, 1989, scrapie has not been officially reported in Alaska, Arizona, Arkansas, Florida, Hawaii, Montana, Nevada, New Mexico, North Dakota, South Carolina, or Puerto Rico.

In the United States, scrapie has been found in Cheviots, Corriedales, Dorsets, Finns, Hampshires, Merinos, Montadales, Southdowns, Suffolks and a number of crossbreds. Of the total 476 flocks that have had infected animals, over 350 have been Suffolk.

C. PATHOGENESIS

1. **Portals of Entry**

Studies by William Hadlow and co-workers (11) on naturally exposed Suffolk sheep have shown that the scrapie agent most likely enters the body via the oral route because it is first detectable in the lymphoreticular tissues along the alimentary tract.

2. **Spread within the Body**

During the first year or two of life in naturally exposed Suffolk sheep, the scrapie agent remains in the lymphoreticular tissues at relatively low titers. By the end of the second or third year, infectivity can be detected in the CNS, where it replicates to high titer in a shorter period of time (11). The method of spread from lymphoreticular tissues to the CNS is not known. Some believe that the agent may be present at low levels in the blood (11), others that infectivity spreads via nerve pathways (12,13,14). Perhaps CNS infection occurs by both routes.

3. **Mechanisms of Tissue Damage**

Because the scrapie agent replicates to highest titer in the CNS, together with the observation that neuronal degeneration is a constant finding in all affected animals, it has been presumed that neurones are the target cell for replication and the likely site of cell injury. However, it will not be possible to understand the mode of replication or mechanisms of cell injury until more is known about the nature of the transmissible agent. It is known that the agent does not use the host's own inflammatory or immune responses to induce tissue destruction. Inflammatory or agent-specific immune responses have never been detected in animals affected with these diseases.

4. **Portals of Exit**

As discussed later, scrapie can be transmitted laterally by exposure to a contaminated environment. This requires some means by which the agent is shed from an infected animal, but that means is not obvious. Some believe that the agent may be excreted at low levels in feces and nasal secretions (11). And, in Great Britain, the scrapie agent has been reported in the fetal membranes of some affected sheep (15,16).

D. NATURE OF THE TRANSMISSIBLE AGENT

1. **Physicochemical Studies**

The major reason for our inability to understand the pathogenesis of infection, its mode of transmission, and to develop diagnostic tests for scrapie is our failure to characterize the transmissible agent. This failure is due in large part to the close association of infectivity with subcellular fractions of host tissue. It has not been possible to "purify" this neuropathogen and identify agent-specific proteins or nucleic acids that can be used as probes or markers for infectivity.

The close tissue associations of the scrapie agent likely contribute to its

remarkable resistance to inactivation by heat, ultraviolet irradiation, and enzymatic degradation. Therefore, until the transmissible agent has been purified to homogeneity, these observations are not particularly useful in drawing conclusions about the essential physicochemical properties of the agent. However, for the purpose of epidemiologic studies on natural transmission, the scrapie agent can be considered to be almost totally resistant to environmental conditions and substantially resistant to tissue processing procedures such as cooking or rendering.

2. **Genetic Susceptibility Factor vs Infectious Agent**

In 1968, Dickinson and co-workers identified a scrapie incubation (Sinc) gene in mice that had a substantial control over the length of the incubation period (8). The product of this gene (although not recognized at the time) was found in 1981 when Merz et al. (17) identified some unusual scrapie-specific fibrils in infected brain tissues. A third laboratory later showed the relationship between the Sinc gene and scrapie-associated fibrils (SAF) by demonstrating that these fibrils were composed of a protease resistant glycoprotein (prion protein). Characterization of this protein resulted in the surprising finding that it was coded for by a host gene (18,19). This observation was soon followed by cross breeding experiments in mice that closely linked the Sinc and prion protein genes (20,21). Furthermore, a correlation has recently been made with respect to primary sequence of the prion protein and the alleles for short and long scrapie incubation periods (22).

Over the years, there has been a great deal of controversy over the nature of the scrapie agent. Now, new biotechnical and recombinant cDNA methods have allowed some narrowing of these possibilities. It is becoming less and less likely that scrapie is caused by a conventional virus. Several searches for nucleic acids in highly infectious preparations have found no evidence for the presence of the amount of high-molecular-weight viral nucleic acid which would be necessary to account for the high infectivity. However, it is still possible that scrapie may be caused by an atypical virus or subviral particle containing a smaller amount of nucleic acid.

Currently, the most popular theory on the nature of the scrapie agent is that the prion gene product may be able to induce the disease independent of exogenous nucleic acids (23). This hypothesis is supported by observations that no disease-specific nucleic acids have yet been identified in highly infectious preparations of the prion protein (24). But, it is contradicted by studies showing that the prion protein can be separated from infectivity (25), that prion protein expressed **in vitro** is not infectious (26), that deglycosylation of the prion protein does not reduce infectivity (25), and that highly infectious preparations can be produced which contain very little prion protein (27).

It has become more and more apparent that the prion gene is an important factor in controlling host susceptibility and the length of the incubation period. It will now be important to study how the interaction of this gene with the transmissible agent is able to produce degenerative brain diseases in animals and man.

E. TRANSMISSION

Scrapie has been described as both an infectious and genetically transmitted disease. This is obviously a major source of confusion for producers. While scrapie has been established to be an infectious disease, evidence for genetic transmission is meager and inconclusive.

1. **Infectious Transmission**

Two types of transmission have been described. One is lateral (or horizontal) and occurs when the disease agent is transmitted among cohorts, i.e., from one animal in a flock to another, or from fomites or other disease-bearing material.

The other type of transmission is **vertical**. Traditionally this has been defined as transmission from parents to offspring during the process of reproduction and during and for a short period after parturition. However, this definition allows an overlap between lateral and vertical transmission for the period during and following parturition. Because of this, particularly as it applies to partitioning the route and mode of transmission as it relates to the embryo, vertical transmission has been defined in more restricted terms as the period "from fertilization through embryonic and fetal development in utero, to the initiation of parturition." Under this definition, exposure outside the uterus constitutes lateral transmission.

a. Distribution of the scrapie agent in the body and the environment. By mouse inoculation, the scrapie agent has been shown to be present in a wide variety of sheep tissues and body fluids. These include the CNS and cerebrospinal fluid, and the following nonneural tissues and related fluids: nasal mucosa, tonsil, lymph nodes, spleen, intestine, pituitary gland, adrenal gland, ovary, uterus including the caruncle, and the fetal placenta (cotyledon) (11,15,16,28,29). However, the agent has not been detected in the placenta of some infected Suffolk sheep (11,29). The scrapie agent has also not been detected in embryos and fetuses, kidneys or urine, salivary glands or saliva, testes or semen, and mammary tissue or milk from infected animals. Furthermore, it has not been found in urine or feces from infected animals or in pasture grass, drinking water, or bedding used by infected animals (11,28,29,30).

Note: Adequate information is lacking for some tissues or materials tested and, therefore, these data should be evaluated with caution. This becomes a very critical point in considering pathogenesis and transmission.

b. Lateral transmission. Scrapie can be spread from animal to animal in infected flocks, including those managed under pasture conditions (29,31,32,33). **The highest incidence of transmission of scrapie is from dams to their own and other offspring**. Transmission from sire to offspring appears to be minimal, probably because sires and offspring rarely comingle under normal management conditions.

Scrapie can also be transmitted to some breeds of sheep not naturally infected (i.e., Rambouillet and Targhee) (34,35) and to goats by infected sheep when they are confined together (29,32). In fact, goats have shown a very high susceptibility to infection when exposed naturally or experimentally to scrapie (29,36,37). Experimental inoculation (oral, intracerebral, subcutaneous) of sheep or goats results in higher than normal transmission and often with reduced incubation periods compared with natural exposure. In these cases, natural barriers to transmission may be reduced or by-passed and the level of the infective agent reaching the CNS increased.

The extent to which the disease is transmitted by contaminated premises, including corrals, barns, feed, water, animal excreta, and bedding, is not known. The scrapie agent has not been detected in any of these materials. Infection of sheep by exposure to contaminated premises has been reported in Iceland (38). However, the possibility that the sheep rather than the premises may have been the source of infection cannot be ruled out.

There is no evidence that scrapie is transmitted by vectors such as birds, small mammals, and external parasites.

c. Vertical transmission. There is no indication that scrapie is transmitted vertically, as more narrowly defined previously.

A study using embryo transfer was conducted dealing specifically with vertical transmission in which the route of transmission was

partitioned into that via the embryo or the uterus. None of the resulting offspring from either potential routes of transmission or the recipient dams exposed by embryos from infected donors (dams and sires) developed scrapie during an observation period of 60 months or longer (39).

Scrapie was not transmitted to dams inseminated with semen from sires experimentally inoculated with the scrapie agent, nor did the disease occur in the resulting offspring (39). This finding is consistent with failure to detect the scrapie agent in the testes or semen and minimizes the role of the ram in possible vertical transmission.

d. Transmission of scrapie is age related. The age of greatest susceptibility to natural infection appears to be during the first few months following birth. The source of the transmitted agent is not known. However, nasal secretions and placenta have been shown to contain the agent and are part of the environment during this period. The intimate relation among the offspring and their dams and other dams during this period provides maximum opportunity for lateral transmission of the disease. The observation that the prevalence of scrapie is greatly reduced in animals intentionally exposed after 6-9 months of age (29) is consistent with reports that the prevalence of scrapie from natural exposure decreases as age at exposure increases (40). The reduced prevalence in older animals might be related to the long incubation period during which death could occur from some other cause before scrapie would become manifest. Because of the relationship of age and prevalence of scrapie, the risk that older animals (i.e., 5 years and older) would develop scrapie or be "carrier" animals would be reduced.

2. Genetic Transmission

There is not sufficient evidence available at present to classify scrapie as a genetically transmitted disease.

In the early 1960's Parry reported (41,42) evidence to show that scrapie is a genetic disease involving autosomal recessive inheritance that also "is artificially infectious by inoculation." Since then, the overwhelming evidence is that scrapie is an infectious disease and that susceptibility to infection is influenced genetically. This is discussed in more detail in the next section.

F. SUSCEPTIBILITY

1. Infectious Agent

As mentioned previously, the greatest susceptibility to natural scrapie infection is during the first few months following birth. This may be due to the intensity of exposure to the agent through intimate contact between infected dams and offspring. Some have suggested that animals become susceptible at the time they become immunocompetent, which in sheep is just before birth.

The source of infectivity is also an important factor in determining whether disease will occur. About 20 different strains of the scrapie agent have been identified in Great Britain (43). Host susceptibility varies with the strain of the scrapie agent (43,44,45), which may occur as a pool of several subpopulations or strains. The susceptibility to scrapie may be influenced by the presence or absence of specific strains of the disease agent. Also, transmission barriers may exist among genotypes, particularly those represented by species.

2. Genectic Susceptibility

Susceptibility to scrapie is strongly influenced by the genetic make-up of animals.

Beginning in the early 1960's, evidence was generated to demonstrate an influence of genetics on susceptibility in sheep (46,47). A specific gene that controls the length of the incubation period was first described in mice and referred to as the Sinc gene (8). Two alleles were identified. The incubation period of one allele in the homozygous state (p7) was twice as long as the second allele (s7). In the heterozygous state, the incubation period was midway between the two extremes, indicating that neither allele was dominant. As mentioned previously, the Sinc gene in mice appears to be the same as the prion gene.

A similar gene, the Sip gene, was located and tested in Cheviot sheep in Great Britain (43,44,45). Two alleles, pA and sA, were identified that control the length of the incubation; pA resulted in longer and sA in shorter incubation periods. The sA allele is dominant to pA so that all homozygous sA and all heterozygotes have short incubation periods. There is also evidence that this gene controls the length of the incubation period in natural scrapie. Characterization of these alleles is expected to provide a method to predict the susceptibility of sheep to developing scrapie disease.

Sheep with the "short" incubation allele appear to develop scrapie about 2-4 years after exposure. Sheep with the "long" incubation allele usually fail to develop the disease because they die from natural causes before the incubation period is completed. It is not known to what extent or under what conditions sheep with the long incubation allele might be a source of infection for other sheep.

The prion gene in sheep has recently been shown by Hunter et al. (48) to be linked to the Sip gene in Cheviot sheep in Great Britain. There is also evidence that other genes may exert an influence on susceptibility to scrapie. Millot et al. (49) has demonstrated a linkage between genetic control of scrapie susceptibility and the locus for the Sheep Major Histaompatibility Complex (OLA) in the Ile-de-France breed of sheep. In this case, the scr' gene was reported to increase susceptibility and Scr' to decrease susceptibility (increase resistance). Millot reported a linkage between the scr locus and two OLA loci. This allowed the transmission of resistance to scrapie to be predicted by OLA typing in cases where this linkage occurred.

## G. CLINICAL SIGNS

Scrapie is a non-febrile, insidious degenerative disease affecting the CNS of sheep and goats. Due to damage to nerve cells, affected animals will usually show behavioral changes, tremor (especially of head and neck), and locomotor incoordination which progresses to recumbency and death (50).

Motor abnormalities often include a high stepping gait of the forelimbs and a "bunny hop" movement of the back legs. This gait is especially exaggerated when the animal is made to run (51). Hypersensitivity is another characteristic sign of scrapie. An infected animal may appear to be normal if left undisturbed at rest, but when stimulated by a sudden noise, excessive movement, or the stress of handling, tremor may appear or the animal may fall down in a convulsive-like state. Some animals appear to be demented and have been observed head pressing or "star gazing." Scrapie-affected sheep, but not goats, also tend to lose much weight despite retaining a normal appetite.

Although scrapie got its name from sheep rubbing themselves against fixed objects, pruritus (itching) may be so subtle as to go unnoticed or so dramatic that an animal will rub off most of its wool. Some animals will also bite at their legs and pull wool from their sides. Affected goats are less likely to rub against fixed objects, but will scratch vigorously with hind feet and horns.

Animals may live from one to six months after the onset of clinical signs. Some diseases that must be ruled out in an animal showing signs of scrapie are external parasites (lice and mites), listeriosis, pseudorabies, pregnancy toxemia, plant toxicoses, lead poisoning, rabies, and brain abscesses.

H. DIAGNOSIS

The diagnosis of scrapie is based on the occurrence of clinical signs of the disease and must be confirmed by microscopic examination of brain tissue at necropsy. However, because of the subtle nature of these lesions, it is sometimes not possible to confirm the diagnosis. In the past, mouse inoculation has been used to test unconfirmed cases, but this method has been discontinued because of time and cost. Studies are now underway to determine whether testing for the presence of the prion protein in scrapie-infected sheep brain is a reliable and relatively simple laboratory procedure that can be used to augment microscopic examination.

One of the goals of scrapie research has been to develop a diagnostic test that can be used on a living animal, preferably to identify preclinically infected sheep so they can be eliminated. However, this is not very likely since the pathogenesis of scrapie is so different from other infectious agents. **Scrapie does not** induce specific antibodies that can be tested for in the serum. **Scrapie does not** produce primary or secondary viremias that can be used to test for the presence of the infectious agent. **Scrapie does not** grow to a high enough titer outside the CNS to place any optimism on the success of testing these tissues. **Scrapie does not** grow to high enough titer in any cell culture system to provide amplification for analytical testing.

Perhaps, after more is understood about the physicochemical nature of the scrapie agent, we will develop new insights on possibilities for preclinical testing.

I. TREATMENT

None

J. PREVENTION

The ideal means for preventing the introduction of scrapie is to maintain a closed flock. Any replacement ewes or breeding rams should originate from scrapie "free" flocks. However, in reality this is difficult to do since no prepurchase test is available to ensure freedom from the disease. The buyer has to rely heavily on the integrity and honesty of the seller, but, because of the long incubation period, the sellers may not be aware that their animals are infected.

**Because of the absence of a diagnostic test, there are few protective options for the purchaser. However, rather than do nothing, the following precautions may be taken:**

1. Check USDA Veterinary Services records to see if the flock has had any infected or exposed animals. These can be obtained from the Veterinarian in Charge of the state.

2. Ask the seller to sign a statement indicating to the best of his/her knowledge that no affected (confirmed by laboratory or exhibiting suggestive signs) or exposed animals have been in the flock.

In making recommendations for preventing infection of "clean" animals used to repopulate a previously infected premise, no procedures are 100 percent guaranteed. Veterinary Services Memorandum No. 557.1 on the Scrapie Eradication Program advises that premises depopulated because of scrapie be disinfected with a two percent sodium hydroxide (lye) solution. The total

effectiveness of this method is questionable. There is also a gray area on the appropriate outside environmental measures needed to prevent a reinfection of scrapie. In Iceland, pastures were left vacant for several years before being restocked with sheep from flocks ascertained to be free. Some of the new animals developed scrapie (38).

K. PUBLIC HEALTH CONCERNS

Ever since the observation that the human spongiform encephalopathies are similar to scrapie (52), there has been speculation that humans may become infected by ingestion of sheep tissues. Because of this concern, USDA eliminated the salvage of affected animals for human or animal consumption in 1975. Since this time, several epidemiologic studies have shown no relationship between the occurrence of Creutzfeldt-Jakob disease and scrapie, nor did they detect any preferential association of affected humans with farm animals, slaughterhouses, or butchershops (53,54).

Studies on the biology of scrapie as passaged from one species to another indicate that every source of infection contains a mixture of scrapie agents or strains (see F-1, p. 6), each having varying pathogenicities for different hosts. Passaging these agents in a single host allows for selection of the strain best adapted to grow in that host. For this reason, it is much more likely that a human would become infected from a human source than from animals.

L. REGULATORY REVIEW

1. History in the United States

1947 - First diagnosis of scrapie in the United States made in a Michigan flock.

1952 - Scrapie diagnosed in a California flock. After insistence from the United States Animal Health Association, the Secretary of Agriculture declared a state of emergency to handle the disease. The eradication program included laboratory confirmation of the disease, quarantine and depopulation of infected flocks, and tracing and slaughter of exposed animals sold from the infected flock. Federal indemnity was paid at this time. The amount was based on 50 percent of the difference between the appraised value of the animal and salvage but not to exceed $25 per head for grade animals and $75 for purebreds.

1953 - The Act of 1884 was amended to include scrapie, and the emergency order was rescinded.

1954 - Title 9 Code of Federal Regulations Part 54 was promulgated. These regulations covered Animals Destroyed Because of Scrapie.

1955 - Regulations were amended to include goats in the program.

1957 - Program was broadened to include source flocks. These were defined as flocks from which an affected animal was removed within 18 months or less before showing signs of scrapie. The source flocks were also quarantined and depopulated. Exposed animals removed from these flocks were traced and slaughtered (10).

1964 - The Scrapie Field Trial began at Mission, Texas.

- International Scrapie Seminar held in Washington, DC.

1965 - The widespread eradication program was modified to allow a provision for bloodline slaughter. In the event that the disease was determined to be limited to one bloodline, slaughter could be



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confined to that genetic line. The non-bloodline animals were placed under a 2-year quarantine with sale to slaughter only. After the 2-year quarantine, the animals were subject to an 18-month surveillance. There was an option in this "bloodline program"* to depopulate the entire infected flock, the source flock, and all exposed sheep when justified by epidemiological findings.

*Note: Although this "bloodline program" was in effect for 10 years, the bloodline option was used in only 4 of some 71 cases.

1975 - Bloodline option was eliminated.

- Exposed animals could no longer be slaughtered for human or animal consumption because of a perceived public health risk.

- Federal indemnity was increased to a maximum of $40 for grades and $90 for purebreds.

1978 - Federal indemnity was paid in the amount of two-thirds of the appraised value of the animal not to exceed $300. This formula was used for both grades and purebreds.

1980 - Canada adopted a bloodline program and this was suggested to the United States.

1982 - On recommendations by the United States Animal Health Association (USAHA) and the National Woolgrowers Association, the Cooperative Scrapie Eradication Program was reviewed. The reviewing groups consisted of representatives from these two groups, research scientists, sheep breed associations, and APHIS.

1983 - The current USDA "Scrapie Eradication Program" as outlined in Veterinary Services Memorandum No. 557.1 (April 8, 1983) went into effect. This consisted of euthanasia of bloodline animals and flock surveillance. The rationale for this change was to reduce indemnity payments and preserve valuable bloodlines without reducing the effectiveness of the program.

1985 - USAHA requested that APHIS conduct an in-depth review of the effectiveness of the scrapie program in achieving the end result of eradication.

1987 - Two of three Scrapie Review Meetings held:

1. USDA Veterinary Services Review
2. Scientific Review

1988 - Third Scrapie Review Meeting held. Group consisted of representatives from industry, research scientists, state regulators, and APHIS.

- Amendment to the Code of Federal Regulations allowing a provision to depopulate an entire flock if determined to be epidemiologically advantageous and more cost effective.

- Advanced notice in the Federal Register of proposed rulemaking, soliciting comments on whether to discontinue the Scrapie Eradication Program.

2. **Current Federal Scrapie Program**

The scrapie program now in effect within the United States is outlined in Veterinary Services Memorandum No. 557.1 dated April 8, 1983.

It is called the Scrapie Eradication Program and involves diagnosing infected animals, tracing and euthanizing bloodlines, as well as surveillance of the infected and bloodline flocks. The specific points of the program are as follows:

a. Clinical diagnosis of an affected animal confirmed by The National Veterinary Services Laboratory. Federal indemnity may be paid providing that the animal is appraised at fair market value before euthanasia and a definitive laboratory diagnosis is made. The owner is compensated two-thirds of the appraised value of the animal but not to exceed $300. (Regulations regarding payment of indemnity are found in 9 CFR Part 54.) The flock is designated as infected.

b. Bloodline animals of the confirmed positive are traced and should be destroyed. The amount of federal indemnity for these relatives is based on the same formula as for the infected animals. The bloodlines designated to be traced and destroyed vary slightly, depending on the sex of the positive animal:

Grandam

Dam

First Generation
(males and females)

**SCRAPIE-AFFECTED EWE**

First Generation (males and females)

Succeeding Female Generations

Grandam

Dam

First Generation
(males and females)

**SCRAPIE-AFFECTED RAMS**

First Generation (males and females)

This distinction was made because the close association between a ewe and her offspring provides considerably more opportunity for exposure. In many instances the ram is never in actual contact with his progeny.

c. In accordance with the Memorandum*, animals considered to be "exposed" are:

1) all animals in the flock in which the affected animal was born and were not destroyed as bloodlines.

2) all animals that were in the same flock at the time of diagnosis of the affected animal.

Flocks containing exposed animals or flocks from which animals are destroyed should be held under surveillance for 42 months after the

last exposure. In the case where infected or bloodline animals are destroyed, this is 42 months from the time these are removed.

d. Surveillance consists of six-month inspections of the flock by a state or federal representative. Surveillance does not constitute any restriction of movement from the flock. Owners are requested to maintain records of movement from the flock, but the flocks into which the animals enter need not be inspected.

e. A flock may be depopulated in its entirety with indemnity if it is determined to be more cost effective than to maintain surveillance.

f. Affected and bloodline animals must be buried or burned. Exposed animals which are destroyed with indemnity must also be buried or incinerated. Otherwise, exposed sheep or goats are not restricted from slaughter.

Note: Procedures outlined in Memorandums are NOT mandated by federal regulations.

Title 9 Code of Federal Regulations (CFR) Part 54 authorizes the destruction and indemnification for certain animals because of scrapie. Other regulations which address scrapie are 9 CFR, Part 91.8: "No sheep shall be exported if it is affected with or exposed to scrapie, or originated from, or has been on any premises which were then infected or source flock premises, or if it is the progeny, sire or dam, or a full or half brother or sister of any animal found to be affected with scrapie, or was moved from premises in an area quarantined for scrapie"; and 9 CFR, Part 79.3: "No sheep shall be moved interstate from or through any quarantined area...."

3. Proposed Federal Program

As previously stated, a resolution was passed at the 1985 United States Animal Health Association Meeting recommending that APHIS review the scrapie program. Three meetings were held to act upon this recommendation. The first, in May 1987, was a review by APHIS personnel. In September 1987, APHIS, in cooperation with the National Institute of Health (NIH), coordinated a meeting of scientists and researchers to review efforts to develop a diagnostic test for live animals and to discuss the public health significance of scrapie. These individuals, together with representatives from the National Wool Growers Association and breed associations, as well as state and federal veterinarians, were present at the last of the review meetings which was held in May, 1988. This group concluded that the current efforts to "eradicate" scrapie have not been effective.

The participants of this May 1988 meeting advocated the following:

a. That most effective program to control scrapie would be to eliminate all affected and exposed sheep at a cost of many millions of dollars. It was the consensus of the group that this approach would not be acceptable to the industry or to USDA.

b. That the present Scrapie Eradication Program be abolished because of the absence of a diagnostic test for the disease in preclinically affected animals and the lack of cooperation from industry and state regulatory officials. The intention to discontinue the program and to solicit comments on this proposal was to be published in the Federal Register.

c. That USDA redirect their efforts and funding toward a Scrapie-Free Certification Program toward education of producers and veterinarians, and toward research on the disease.

Note: Canada has a control program similar to that of the United States, and a veterinarian from the Canadian Division of Animal Health in attendance at the

third meeting expressed similar frustrations regarding the effectiveness of their scrapie eradication efforts.

As a result of this evaluation, APHIS published in the November 2, 1988 Federal Register an advanced notice of proposed rulemaking to solicit public comments on whether to discontinue the Scrapie Eradication Program. Each of the comments received will be read and addressed with a response. At present, APHIS plans to use the Negotiated Rulemaking System to attain an amendable solution to the problem of scrapie.

One of the suggestions to come out of the review was the concept of a Scrapie-Free Certification Plan. The basic approach was to have a series of stages with criteria that a flock would have to meet before it could be advanced to the classification of scrapie-free. The program would be voluntary and industry oriented. APHIS could assist with diagnostic capabilities and surveillance. Attached is a draft of a possible certification plan developed by Veterinary Services (p. 15).

4. **State Regulatory Policy**

Only in an emergency is federal authority used to quarantine. Domestic disease control and eradication efforts rely heavily upon individual state regulations and enforcement policies. APHIS queried each of the 50 states about their regulations covering scrapie, the existence of active state control programs, and participation in the federal program. There was a definite lack of uniformity among the states' attempts to handle the disease. No state has a scrapie control/eradication program independent of the federal one. Under state authority, scrapie is not even a reportable disease in Arizona and Ohio. California, Maryland, Montana, New Hampshire, Oregon, and Wisconsin have regulations that require some form of scrapie indemnity payment from the state.

The concept of quarantining scrapie-exposed animals lends itself to a fair amount of variation. From a regulatory aspect, there must be guidelines to release a quarantine once it is imposed. The unknowns surrounding the meaning of "scrapie-exposed" pose a real problem in administering a quarantine. This double-edged sword is a dilemma both for the regulatory agency (how long a quarantine is adequate?) and for the producer (how long can I survive financially with a restriction of movement?). How an individual state handles the question of quarantine depends on the past history of scrapie control efforts within the state, the number of confirmed cases, outside pressures, and available scientific data on what will work. Listed below are some examples of how this differs from state to state:

a. Illinois and Ohio, the two states with the highest number of infected flocks in the nation, do not quarantine any animals because of scrapie. This includes affected bloodlines as well as exposed animals.

b. Indiana quarantines flocks having animals showing clinical signs or containing bloodline animals. The quarantine is usually lifted once these animals are removed. A flock consisting of only exposed animals will occasionally be held under quarantine if it has been determined to be heavily infected.

c. States like California, Connecticut, Georgia, Hawaii, Iowa, Kansas, Maryland, Nebraska, Rhode Island, and West Virginia quarantine flocks with infected and bloodline animals. This quarantine is released when these animals are removed.

d. Alaska, Arizona, Florida, Mississippi, Montana, New Mexico, North Dakota, South Carolina, and South Dakota have regulations requiring the quarantine of scrapie-exposed animals. These states indicated the regulations would be enforced if they ever had an infected flock.

e. Illinois, New York, Virginia, and Michigan do not participate in the current

APHIS cooperative program.

4. INDUSTRY INVOLVEMENT

Scrapie is a very frustrating problem to deal with, not only on the part of regulatory agencies but for the producer as well. There is no assurance when one buys sheep that one is not buying scrapie. Even more disheartening is the fact that after an owner battles the disease once, no one is sure what precautions must be taken to prevent a reinfection or where to buy "clean" sheep. Lack of adequate scientific knowledge is only part of this problem. In the not too distant past, at least one breed association did not take scrapie seriously. Owners were discouraged from cooperating with state and federal authorities.

Other industry related obstacles revolve around records and identification. A means of permanent identification is an absolute essential to keeping track of animals exposed to a disease with such a long incubation period, especially with a program that does not include mandatory depopulation. However, with advancements in technology there are types of identification that may be effectively utilized in control efforts. A totally tamper proof method of animal identification has not yet been devised. Complete and accurate records are also a necessity in tracing scrapie-exposed sheep and source flocks. Lack of identification and inadequate records of movement and sales hav added to the dilemmas of the current program.

A sensitive issue that must be addressed is producer honesty and integrity. With no diagnostic test for the live animal, and no authority to seize and euthanize a producer's sheep for positive confirmation, the identification of infected flocks depends almost solely on the owner's agreeing to allow this to happen. Although most breeders are cooperative and want to do what is best for the industry, there have been occasions when owners would not allow samples to be submitted from sheep showing signs characteristic of scrapie. Unfortunately, some of these individuals have not only sold to other flocks but exported sheep to other countries.

**PROPOSED SCRAPIE-FREE CERTIFICATION PLAN**

Scrapie-Monitored Flock

1. No scrapie diagnosed in flock since originated.
2. No scrapie bloodline animals traced into flock during preceding five years.
3. No scrapie bloodline animals traced back to flock from known infected flocks.
4. Owner certifies that he/she will have all animals with scrapie-like clinical signs examined for the disease.
5. All replacements must originate from flocks with no history of scrapie or, preferably, from flocks on certification plan.

Scrapie-Certified Flock

1. No scrapie diagnosed in flock since originated.
2. No scrapie bloodlines traced into flock for preceding five years.
3. No scrapie bloodlines traced back to the flock from known infected flock.
4. Owner documents that all animals showing scrapie-like clinical signs have been examined by a qualified laboratory with negative results.
5. All replacements during the preceding ?? years have originated from scrapie monitored, -certified, or -free flocks.

Scrapie-Free Flock

1. A flock that has held certified status for two years and has carried out all provisions without evidence of scrapie.
2. All animals with scrapie-like clinical signs will be examined by a qualified laboratory with negative results.
3. All replacements will originate from certified or free flocks.
4. Flocks must maintain records to requalify every two years.

SCRAPIE INFECTED FLOCKS

(1947 - September 30, 1988)

Nebraska and Delaware have had two cases of scrapie diagnosed in 1989.

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August 3, 1989

The Honorable Charles W. Stenholm
Chairman, Subcommittee on Livestock, Dairy, and Poultry
Committee on Agriculture
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman,

Thank you for the opportunity to appear before the Subcommittee on Livestock, Dairy, and Poultry on July 27, 1989.

As we stated in our testimony, an effective scrapie eradication program must apply sound scientifically-based epidemiological procedures, based upon current knowledge.

We would like to further address the Committee's question, "How would you conduct a trial or model flock certification program?" We've attempted to answer that question here by describing the objectives and procedures for such a program, along with suggestions as to who should carry out the program. We emphasize that a "scrapie free flock certification program" can work only if it is an integral part of a broader plan. It must be part of a sound, adequately funded federal program using depopulation and indemnification. Also there must be uniform compliance and enforcement.

To meet the industry's needs for a scrapie program, funds should be allocated for basic research and for application and method development.

DEVELOPING SCRAPIE FREE FLOCKS USING RISK REDUCTION PROCEDURES DEVELOPED IN THE COOPERATIVE EMBRYO-TRANSFER PROJECT: A TEST PROGRAM.

OBJECTIVES:

To test procedures for establishing scrapie free flocks using the flocks of producers participating in a voluntary program to certify animals free of scrapie.

To provide a workable approach to controlling scrapie using the existing technology.

To provide the industry with a genetic pool of animals that is free of the scrapie disease and that is genetically resistant to scrapie.

To provide the industry with a method of preserving (salvaging) superior germ plasm from scrapie-infected animals.

To test and implement procedures for permanent identification of individual animals.

To develop and validate a record keeping system for verifying pedigree information required for establishing a scrapie-free flock certification program.

PROCEDURES:

The pilot project or test program should involve a minimum of three flocks in three states over at least a six year period. It should be conducted under the existing cooperative program between USDA/APHIS/VS and Utah State University. The pilot project should be based on risk reduction procedures including the following: scrapie status in flock of origin, age of animal, gene probe for genetic resistance, embryo transfer technology, scrapie free recipients, scrapie free premises, bioassay of mesenteric lymph nodes of donor animals, isolation and surveillance.

SUPPORT:

USDA Cooperative Program (APHIS/Utah State University) - Responsible for planning and carrying out all phases of the program. Provides laboratory assistance for confirmation of diagnosis and application of bioassay. Assists in developing protocol and monitoring, supervision, surveillance and evaluation of regulatory requirements for a certification program. The project coordinators will seek voluntary producer, purebred, state and scientific organization cooperators who, once selected, will strictly adhere to protocol.

Producer - Participation in terms of access to flocks and adherence to protocol.

Industry (purebred organizations) - Participation in terms of access to records, evaluation of pedigree records, and the evaluation of the record keeping system for flock certification.

State - Participation in terms of monitoring protocol, surveillance, and evaluating state regulatory requirements for carrying out a flock certification program.

Cooperating Scientists - Participation in terms of applying state-of-the-art technology for determining the status of animals and providing technical and diagnostic assistance. This will involve the coordination, utilization and transfer of biotechnology on an international scale to address the scrapie problem in the United States.

A scrapie eradication program including flock certification should include both risk reduction procedures and indemnification. The model program outlined above will apply and demonstrate existing and emerging technology in developing scrapie free flocks.

Respectfully submitted,

| | | |
|---|---|---|
| Paul Rodgers<br>Sheep Industry Development<br>Program Director | Warren Foote<br>Utah State University | Richard Marsh<br>University of Wisconsin-<br>Madison |

Testimony submitted by

Dr. Warren C. Foote, Professor of Animal Physiology, Department of Animal, Dairy and Veterinary Sciences, Utah State University, Logan, Utah. Also, a member of Sheep and Goat Committee, USAHA and a member of the Scrapie Task Force of the Sheep Industry Development Program, Inc. and its Scientific Advisory Subcommittee.

Before The

House Agricultural Subcommittee on Livestock, Dairy and Poultry

Concerning

HR799 Bill entitled "Scrapie Eradication Act"

July 20, 1989

Dear Mr. Chairman,

I am pleased to be here today to address the issue regarding scrapie in the U.S. sheep industry. I am a professor of Animal Physiology in the Department of Animal, Dairy and Veterinary Sciences at Utah State University in Logan, Utah. I am a member of the Scrapie Task Force of the Sheep Industry Development Program, Inc. and of its Scientific Advisory Subcommittee and also a member of the Sheep and Goat Committee of the U.S. Animal Health Association.

As a scientist I have worked for approximately 35 years in research and development in sheep and goats. For 10 years I have been involved through Utah State University in a cooperative research program with USDA/APHIS/Veterinary Services and the State of Utah dealing with the transmission of scrapie, primarily its vertical transmission. I also work as a private consultant in programs relating to sheep and goats.

I understand that the report on scrapie prepared by the Scientific Advisory Subcommittee to the Scrapie Task Force of the Sheep Industry Development Program, Inc. has been made a part of this congressional hearing. I contributed to that document, particularly to the sections on transmission and susceptibility. I concur fully with the contents of the document and will rely upon it for scientific and documentary information for this hearing.

The following points concerning scrapie appear relevant.

- Scrapie is an infectious disease. The scrapie agent has not been identified but it is closely related to the prion.

- Scrapie is transmitted laterally or from animal to animal in a flock. It is probably transmitted orally and the greatest incidence results from exposure of the offspring at and during the first few months after birth.

- Scrapie does not appear to be transmitted vertically when defined as

- Scrapie does not appear to be transmitted vertically when defined as the period from fertilization to initiation of parturition. Results of research show that embryo transfer can be used to prevent scrapie transmission.

- Available information is unclear concerning the infectivity of contaminated premises. The incredible resistance of the disease agent to destruction and the potentially high concentrations of the scrapie agent that might occur in areas such as lambing areas suggests caution in drawing conclusions. Thorough cleaning of barns and corrals and spraying with a sodium hydroxide (lye) solution, and tilling of pasture areas and vacating for one or more seasons is indicated. Also lambing in a new area provides an additional safeguard.

- Susceptibility or resistance to scrapie is determined genetically by a gene, the Sip gene. One form of the gene or allele results in a short incubation period of usually 2-4 years. Another allele results in a long incubation period which is usually greater than the life span of the sheep. These latter sheep would, therefore, never develop scrapie, however, it is possible that they might infect others during some periods. A gene probe has been developed which may make possible determining whether an animal has a short or long incubation period. This would allow selection for animals with long incubation periods which constitutes resistance to the disease. Interactions between the breed of sheep and scrapie strain will probably complicate this procedure.

- There is no preclinical diagnosis for scrapie and the period of time until a procedure will be developed cannot be predicted. Mouse assay of tissue such as mesenteric lymph nodes provides limited screening in the live animal for the presence of the scrapie agent.

- Development of a vaccine to immunize against scrapie is not plausible because of the absence of an immune response to the scrapie agent.

**APHIS has been active in research activities related to scapie.** The Veterinary Sciences facilities at Mission, Texas was established in the mid 1960's to study scapie. This provided basic resources and served as a focal point both within the U.S. and internationally for the development of much of the early information on scrapie transmission. In addition, veterinary services provided support to scientists at other locations working with scapie and related diseases.

In 1979, cooperative research was undertaken by Veterinary Services with Utah State University and the State of Utah to determine the route of vertical transmission of scrapie in sheep and goats using embryo transfer. The results from these experiments provide strong evidence that scrapie is not transmitted vertically and that embryo transfer can prevent scrapie transmission. Additional studies, under the same cooperative arrangements are underway or planned that deal with the use of a gene probe to identify genetically resistant animals, embryo transfer, and their application to support the U.S. sheep industry, and epidemiology, including measuring infectivity of contaminated premises. All of these studies deal with natural scrapie.

**Scrapie was first diagnosed in the United States in 1947.** An eradication program was established by the Federal government and some state governments beginning in 1953. During the period since 1953 the program to eradicate scrapie has varied from total depopulation of infected flocks to depopulation based on bloodlines. During the period from about 1970 to 1989 there was some evidence that the disease might be under control (see accompanying figure). But beginning with 1980 the number of flocks with diagnosed scrapie outbreaks has dramatically

increased (from 11 flocks in 1980 to 52 flocks in 1988 and 59 to July, 1989). This increase could be due to an increase in recognition and reporting of suspect animals or an increase in the occurrence of scrapie or both.

**The scrapie eradication program has not been effective.** In my opinion the reasons for this include the following: lack of essential information on scrapie, lack of adequate funding, lack of compatibility of programs between the federal and some state governments, lack of commitment of some federal and state personnel, lack of support by some sheep related organizations, and failure of some producers to provide complete and accurate records concerning their flocks.

It is essential that an effective scrapie control program be developed and carried out. But the options appear extremely limited. One option that has been suggested is depopulation with indemnity for destroyed animals. In my opinion depopulation even of large segments of the sheep population will not provide a solution. Information is not available to know which flocks or breeds to depopulate. To date this year, there have been 59 flocks with scrapie outbreaks and approximately 194 exposed flocks totaling 12,000 sheep. There is no way to identify all flocks that are exposed. The projected number of exposed flocks for the current year is 260 totaling 15,000 sheep. It is further estimated that as many as 5,000 sheep should be depopulated this year at a cost of $1,500,000 under the existing program.

The majority of flocks with scrapie outbreaks has been of the Suffolk breed but scrapie has also been diagnosed in nine other breeds and several breed crosses. This includes four breed and two breed crosses in addition to the Suffolk breed to date in 1989. One of these breeds has not been reported previously. This demonstrates that the disease is not limited by breed and that

additional breeds will become involved in the future. All of this further points out that depopulation is not a viable solution.

The cost of an extensive depopulation program, its effect on the genetic composition of U.S. sheep and the preceived refusal by the U.S. sheep industry, in addition to its ineffectiveness, make this an unworkable approach to control scrapie.

A certified scrapie free flock program can become an effective option. It could be based on a risk reduction procedure (RRP) where points where scrapie might be transmitted are identified and the risk of transmission at each point is minimized. The overall risk becomes a function of the risk at each point and could be reduced to essentially zero.

The steps or components in the RRP program should include (1) status of source flock in regard to scrapie outbreaks (i.e., minimum of five years), (2) age of source animals (i.e., minimum of five years), (3) obtain germ plasm as embryos (or possibly by Caesarean section), (4) screen for presence of scrapie in source animals by mouse assay of mesenteric lymph nodes (up to two years time required), (5) transfer embryos to scrapie free recipients and premises, and (6) isolate and observe offspring and source animals for scrapie for a minimum of two years. An additional, very important component when available, would be the use of a gene probe to identify and select source animals and their offspring for genetic resistance to scapie (long incubation period). This would not act directly to eradicate scrapie, but would develop populations resistant to scrapie.

The use of a preclinical diagnosis for scrapie, when it becomes available, would eliminate several of the above steps and greatly facilitate the program. However, not having this diagnostic tool does not invalidate the program.

Permanent identification is an essential part of a scrapie control program. An ideal method is not currently available but a method such as hot iron branding can be adequate. An indispensable component of a successful scrapie control program is commitment and cooperation by all persons and agencies involved.

Some form of the Risk Reduction Procedures are presently being utilized by at least one producer to develop a scrapie free flock. Other producers are also considering this option. Very important components to a scrapie control program are embryo transfer and the testing and use of a gene probe to determine resistance to scrapie.

In terms of a scrapie control program I submit the following comments and recommendations.

1. The current scrapie eradication program should continue in some form until a new program is developed and established.

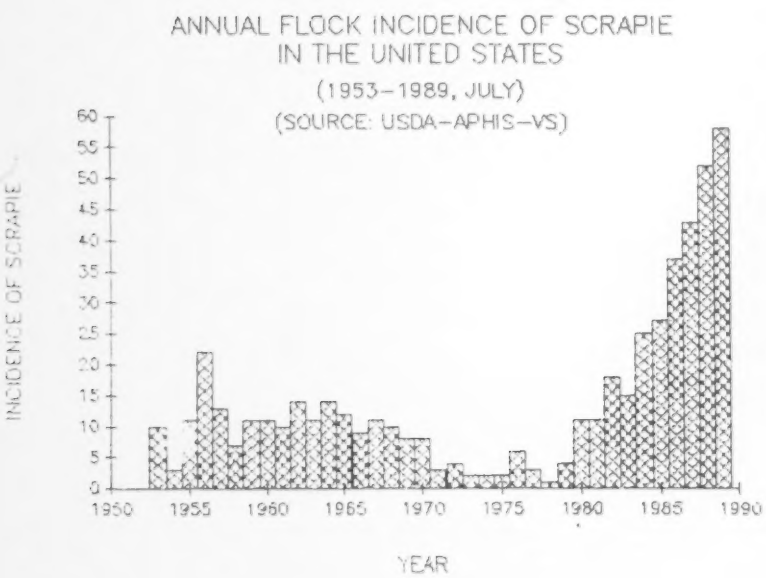
2. Although selective depopulation and identification will likely be a necessary part of a successful program these alone or as a major component will not contribute effectively to a scrapie control program.

3. A scrapie free certification program is the most effective option for a scrapie control program. The lack of a preclinical diagnostic procedure does not invalidate this option. Major components of this program are embryo transfer and a gene probe for scrapie resistance.

4. Increased research is an essential part of a scrapie control program. Research needs include, (1) preclinical diagnosis of scrapie, (2) continued development and testing of gene probes to identify animals genetically resistant to scrapie, (3) continued research on the use of embryo transfer and on epidemiology with natural scrapie, and (4) continued research on the relationship

of scrapie to other spongiform encephalopathies in man and animals including cattle.

5. Education is critical to a successful scrapie control program. We complain about the things we don't know about scrapie but neglect to provide information on what we do know and how it can be applied. Education is necessary for all persons involved and at all levels. Scrapie research is very dynamic and often controversial. Part of effective education is continual update and review.



**UNIVERSITY OF WISCONSIN–MADISON**

**DEPARTMENT OF VETERINARY SCIENCE**

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July 20, 1989

Representative Charles W. Stenholm
Chairman, Subcommittee on Livestock,
Dairy, and Poultry
Room 1301, Longworth House Office Building
Washington, D.C. 20515

Dear Congressman Stenholm:

Thank you for inviting me to appear before your Subcommittee to present testimony on H.R. 799. I have worked on scrapie for twenty-five years and feel I have a good perspective on the disease, especially on experimental findings over this period of time.

I understand that your Subcommittee has received copies of the Report of the Scientific Advisory Subcommittee to the Scrapie Task Force of the Sheep Industry Development Program, Inc. This document summarizes our present knowledge on scrapie disease as acknowledged by most scientists working in the field. With this information as a background, I would like to make the following comments concerning my assessment of the Scrapie Eradication Program:

1. The major problem of the Program is that there is **no diagnostic test** for the disease in preclinically infected animals. It is impossible to have a successful control or eradication program without a diagnostic test.

2. In my opinion, the essential part of the transmissible agent is a **small nucleic acid** which has not yet been identified. If this component can be characterized, sensitive probes could be developed to distinguish infected from noninfected animals. Research on the disease should emphasize these investigations.

3. The transmissible agent only affects those animals which are **genetically susceptible**. The discovery and characterization of these susceptibility genes are the most important findings in scrapie research in many years. It is now likely that within the near future it will be possible to test bloodlines of sheep for their susceptibility or resistance to scrapie disease.

4. Research should emphasize methods to detect these susceptibility genes, and to make these procedures **available to the sheep producer** so that they can develop resistent bloodlines.

5. **There is no evidence that scrapie represents a public health risk.**

6. There is a new disease in Great Britain called bovine spongiform encephalopathy (BSE) which has been caused by feeding cattle rendered protein concentrates from scrapie-infected sheep. **There is no evidence that BSE is present in the United States.**

7. My recommendation is that we **eliminate the Scrapie Eradication Program** in favor of a scrapie-free certification plan in which APHIS would **cooperate** with the states and producers to provide gene testing and diagnostic services for clinically affected animals.

I hope these comments have been helpful. I will be glad to answer any questions when I appear before your Subcommittee.

Sincerely,

R.F. Marsh
Professor

RFM/mlw
xc: Dr. James Glosser,
APHIS Administrator

AMERICAN FARM BUREAU FEDERATION
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July 20, 1989

Dr. James W. Glosser, Administrator
Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE
Washington, D.C. 20250

Dear Dr. Glosser:

The AFBF Sheep Advisory Committee, at its May 1989 meeting, expressed growing concerns about scrapie, a disease of the central nervous system of sheep and probably goats. The committee requested that AFBF ask USDA-APHIS to take the following actions concerning this disease which were reviewed by the AFBF board of directors at its June 1989 meeting:

1. Initiate a state-by-state study to determine the scope of the scrapie problem;

2. Invite key researchers who are working directly on scrapie-related projects to participate in a meeting and/or to contribute information on the scientific aspects of the disease and how it can be eradicated;

3. Encourage state-by-state producer educational programs through state veterinarians and allied organizations with emphasis on flock management;

4. Determine the cost of declaring an emergency action coupled with an incentive plan to depopulate all flocks that are currently quarantined due to the disease and that are expected to be found; and

5. Establish a task force made up of selected producers who have the disease in their flocks, producer organizations and veterinary representatives to provide guidance in establishing a revised and more effective eradication effort.

We also support a coordinated and concentrated research program to determine the causal agent and a method of diagnosing scrapie in live sheep and goats and to encourage the development of a positive method of identification to enhance the traceback and depopulation of infected siblings.

Farm Bureau supports efforts to adequately fund scrapie indemnification and research.

We urge USDA's APHIS to utilize these recommendations to strengthen the scrapie program.

Sincerely,

Harold J. Hartley, Director
Commodity and Marketing Division

HJH:mp

c: Charles Stenholm, Chairman
House Subcommittee on Livestock, Dairy and Poultry

John C. Datt, Executive Director
AFBF Washington Office

Alfred W. Keating, Director
AFBF Livestock Department

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PAUL E. KINDINGER, Director

August 3, 1989

Honorable Charles W. Stenholm, Chairman
Subcommittee on Livestock, Dairy, and Poultry
House of Representatives
1226 Longworth House Office Building
Washington, D.C. 20515

Dear Congressman Stenholm:

I am writing in reference to H.R. 799 "Scrapie Eradication Act." Our State Veterinarian, Dr. Harry Michael Chaddock, had the honor to testifying on July 27, 1989, before your subcommittee on the panel with Dr. James W. Glosser, Administrator, United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA/APHIS).

As Dr. Chaddock testified, Michigan has had a considerable number of scrapie sheep and scrapie bloodline traceback animals over the past several years. The current voluntary USDA/APHIS scrapie "eradication" program, taking into account only possible vertical (bloodline) transmission is not making progress in attaining the goal of eradication and should be discontinued. Below are suggestions that would improve H.R. 799 and allow industry, research, and regulatory agencies to work cooperatively to control and hopefully eventually be able to develop a program to eradicate scrapie from our sheep industry.

1. Remove the mandatory eradication language from the bill since there currently is not available a test for scrapie on live animals and the exact pathogen has not been described.

2. Incorporate a pilot project in the bill based on risk reduction procedures for establishing scrapie free flocks using flocks participating in a voluntary certification program. Built into this project will be cooperation by USDA/APHIS, producers, purebred sheep organizations, and state regulatory agencies.

3. Appropriate adequate funds to USDA/APHIS for application and method development of the program and meaningful federal indemnity to producers whose animals are ordered destroyed by USDA/APHIS.

4. Appropriate adequate funds for the USDA Agricultural Research Service so meaningful scrapie research can be continued to determine the exact causative agent, a pre-clinical test, and hopefully, a preventative measure.

I appreciate the opportunity to express these ideas.

Sincerely,

Acting Director

BDC: HMC/jyd

# CALIFORNIA WOOL GROWERS ASSOCIATION

July 21, 1989

The Honorable Charles Stenholm, Chairman
Livestock, Dairy and Poultry Subcommittee
1226 Longworth House Office Building
Washington, D. C. 20515

Dear Congressman Stenholm:

The CWGA views the disease Scrapie in sheep with deep concern.

The association also views the present Scrapie eradication program with deep concern. To be effective some changes will have to take place. In it's June meeting, the Board of Directors approved several suggested program changes.

1 - All Suffolk sheep of scrapied flocks not slaughtered should be identified by electronic chips. The pedigree of all these animals be put on computer. Over time such surveillance would reveal the effectiveness of our present bloodline program by identifying contact infection.

2 - States agree to a Federal-State cooperative agreement. Penalties be devised to insure agreement.

3 - There must be industry support for the program.

At a subsequent meeting attended by Drs. Larry Vanderwagon, George West both of the California Department of Food and Agriculture, Dr. John Glenn of the University of California Veterinary Extension, Olin Timm and Jay Wilson of the CWGA, the above three topics were discussed.

Topic three was covered first. George West described the proliferation of small Suffolk flocks whose owners have no knowledge of scrapie. To educate these growers, the standard mechanisms of newsletters and extension were mentioned and also it was suggested the information be distributed through feed stores.

Topic one, identification was also discussed. Dr. West emphasized the total cooperation he had had with both Suffolk associations. And also in tracing animals, he had found no discrepancies in pedigrees of different growers.

Don Torell
President
Ukiah, California

Joe Esnoz
Vice President
Lost Hills, California

Jay B. Wilson
Executive Vice President
Sacramento, California

Unifying the Voice of the California Sheep Industry Since 1860
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# CALIFORNIA WOOL GROWERS ASSOCIATION

Page 2, The Honorable Charles W. Stenholm
July 21, 1989

It was felt that a program of placing identification chips in all offspring be adopted by the respective breed associations. The USDA might have to financially encourage the initiation of the program.

The problem of source flocks was not discussed, but definitely a chip program would ensure that the owners quarantined animals were being slaughtered not animals from some other flock.

Topic two, state cooperation was not discussed. It was acknowledged that the surveillance which exists in California is completely the work of the California Department of Food and Agriculture. Surveillance is the key to a program. Without surveillance, a program is doomed.

Sincerely,

Olin Timm

Olin Timm, Chairman
Animal Health Committee

cc: Members of the Livestock, Dairy and Poultry Subcommittee

1 Note: my source of knowledge on chips comes from Ralph Knowles who is involved in an animal identification company, Destron/IDI 2545 Central Avenue, Boulder, Colorado, 80301. Tom Payne (303) 444-5306 Ralph Knowles (302) 227-2707. The cost of the chips would be $2.00, the present Reader $900.00 but could be made much cheaper. Dr. Mitchell Essey, APHIS is working with these chips in Hogs.

2 The state representatives informed us that 65% of scrapied sheep in California all come from the same bloodline.

Don Torell
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Ukiah, California

Joe Esnoz
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